High h Batch Service Manual

FOR THE TURBOCHEF HIGH H BATCH OVEN

Accelerating the World of Cooking™

800.90TURBO
Part Number: HHB-8707/Revision A/June 2005

For further information call:
Customer Service *at* 800.9OTURBO
Sales & Marketing *at* 866.9OTURBO

Accelerating the World of Cooking™

The information contained in this manual is important for the proper installation, use, maintenance, and repair of this oven. Follow these procedures and instructions to ensure satisfactory baking results and years of trouble-free service.

Errors – descriptive, typographic, or pictorial – are subject to correction. Specifications are subject to change without notice.

PLEASE CAREFULLY READ THIS MANUAL AND RETAIN IT FOR FUTURE REFERENCE.

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Diagnosing an Issue

The Control System

IMPORTANT SAFETY INFORMATION – PLEASE READ FIRST

Improper installation, adjustment, alteration, service, or maintenance of this equipment can cause property damage, injury, or death. Thoroughly read the installation, operating, and maintenance instructions before installing or servicing this equipment. Strictly adhere to the following safety information to reduce the risk of:

- Damage to the oven
- Damage to property near the oven
- Personal injury
- Burns
- Fire
- Electric shock

GENERAL SAFETY INFORMATION

- Use this appliance only for its intended uses as described in this manual.
- Only qualified service personnel should service this appliance. Contact the nearest authorized service facility for examination, repair, or adjustment.
- Always ensure the oven is disconnected from the power supply before servicing, repairing, or adjusting any components or parts.
- DO NOT place the cord near heated surfaces.
- DO NOT store or use flammable vapors or liquids (e.g., gasoline) in the vicinity of this appliance.
- DO NOT allow children to use this appliance.
- DO NOT place corrosive chemicals or vapors in this appliance. It is not designed for industrial or laboratory use.
- DO NOT operate this appliance if it
  - Has a damaged cord or plug
  - Is not working properly
  - Has been damaged or dropped
- DO NOT cover or block any openings on this appliance.
- DO NOT store this appliance outdoors.
- DO NOT use this appliance near water.
- DO NOT immerse this appliance or any of its components (e.g., cord, plug, etc.) in water.
- DO NOT let the cord hang over the edge of a table or counter.

REDUCING FIRE RISK

If materials inside the oven ignite or if smoke is observed,

1. Keep the oven door closed.
2. Turn off the oven.
3. Disconnect the power cord or shut off power at the fuse/circuit breaker panel.

- Carefully attend the oven if paper, plastic, or other combustible materials are placed inside the oven to facilitate cooking.
- DO NOT leave items in the Cook Chamber when the oven is not in use.
- DO NOT cook items wrapped in cling wrap or plastic film.
- DO NOT overcook food.

PREVENTING OVEN DAMAGE

- ▫ When servicing this appliance, do not tear insulation to get to components. Rather, find the edge of the insulation and remove the tape that holds it in place.
- ▫ Operate the oven only when food is in the Cook Chamber.
- ▫ Clean the oven daily.
- ▫ Clean the oven only with TurboChef Oven Cleaner.
- ⊠ DO NOT clean with a water jet.
- ⊠ DO NOT slam or mishandle the oven door.
- ⊠ DO NOT frequently open and close the door to check the cook status of the food.
- ⊠ DO NOT allow cleaning solution or water to remain in the Cook Chamber longer than necessary.

GROUNDING INSTRUCTIONS

⚠ WARNING: Improper grounding increases the risk of electric shock.

This appliance must be grounded. It is equipped with a cord that has a grounding wire and plug that, in the event of an electrical short circuit, reduce the risk of electric shock by providing an escape wire for the electric current. The wire must be plugged into an outlet that is properly installed and grounded. Consult a qualified electrician or serviceman for help understanding

- ▫ Grounding instructions
- ▫ Whether or not the appliance is properly grounded

- ⊠ DO NOT use an extension cord. If the power supply cord is too short, request a qualified electrician or serviceman to install an outlet near the appliance.

POWER CORD REPLACEMENT

To avoid potential hazards, only the manufacturer, its service agent, or a similarly qualified person should replace a damaged power cord.

Theory of Operation, Specifications, and Installation

THEORY OF OPERATION

The TurboChef® High h Batch speed cook oven uses high heat transfer rates developed by force air impingement to rapidly cook food. The High h batch utilizes top and bottom Jetplates that have been optimized for specific food items. The plates can be easily removed and replaced to facilitate either higher or lower heat transfer rates. As a result, the operator can cook foods that require maximum browning/caramelizing (high heat transfer), or more delicate foods that require low heat transfer to ensure quality is not compromised.

The technology is similar to but about twice as fast as the fastest impingement conveyor oven. The High h Batch utilizes a variable speed blower, oscillating rack, and Catalytic Converter to provide maximum speed, minimal energy input, ventless operation and the highest food quality.

CERTIFICATIONS

UL, cUL, NSF

DIMENSIONS

Single Units		
Height	20.5″	(521 mm)
Width	25.5″	(648 mm)
Depth	29″	(737 mm)
with handle	31.5″	(800 mm)
Weight	157 lbs.	(71 kg)
Double Units (requires Stacking Kit)		
Height	41″	(1042 mm)
Width	25.5″	(648 mm)
Depth	29″	(737 mm)
with handle	31.5″	(800 mm)
Weight	314 lbs.	(42 kg)
Cook Chamber		
Height	8″	(203 mm)
Width	18.75″	(476 mm)
Depth	16.75″	(425 mm)
Volume	1.45 cu. ft.	(41.1 liters)
Wall Clearance		
Top	2″	(51 mm)
Sides	2″	(51 mm)

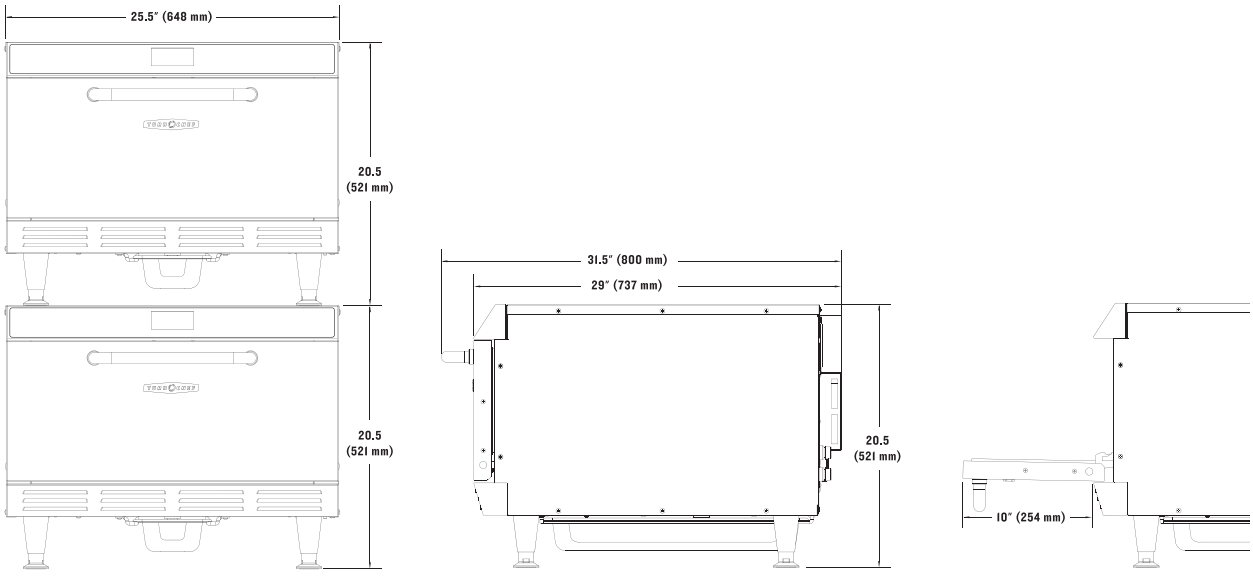


FIGURE 1: High h Batch Dimensions

CONSTRUCTION

Exterior

- Stainless steel front, top, sides, and back
- 4″ (102 mm) matte black legs
- Cool-to-touch coated handle
- Removable drain pan
- Removable cook door for cleaning

Interior

- 304 stainless steel interior
- Drain system helps prevent debris buildup
- Removable Jetplates for deep cleaning

ELECTRICAL SPECIFICATIONS

North America (except Canada)/South America

- HHB (P/N: HHB-8601-1)

Phase	1
Voltage*	208/240 VAC
Frequency	50/60 Hz
Current	24 amp
Cord	10 gauge, 3 wire, 6 foot, SOOW
Plug	NEMA 6-30P

Canada

- HHBC (P/N: HHB-8601-1C)

Phase	1
Voltage*	208/240 VAC
Frequency	50/60 Hz
Current	24 amp
Cord	10 gauge, 3 wire, 6 foot, SOOW
Plug	NEMA 6-50P

*Smart Voltage Sensor Technology automatically senses the supply voltage and configures the oven to the correct setting (208 or 240). It does not compensate for lack of or over voltage situations.

Europe/Asia/Pacific

- HHBEW (P/N: HHB-8601-1W)

Phase	3
Voltage	400 VAC
Frequency	50/60 Hz
Current	10 amp
Cord	HO7RN-F, 5 wire
Plug	IEC 309, 5-pin, 16 amp

- HHBED (P/N: HHB-8601-1D)

Phase	3
Voltage	230 VAC
Frequency	50/60 Hz
Current	18 amp
Cord	HO7RN-F, 4 wire
Plug	IEC 309, 4-pin, 32 amp

United Kingdom/Ireland

- HHBUK (P/N: HHB-8601-1K)

Phase	1
Voltage	230 VAC
Frequency	50/60 Hz
Current	24 amp
Cord	HO7RN-F, 3 wire
Plug	IEC 309, 3-pin, 32 amp

NOTE: The owner is responsible for supplying voltage that corresponds to the above specifications. For help in answering questions about electrical specifications, consult a qualified electrician.

INSTALLATION

Install or locate this appliance only in accordance with the instructions below.

Lifting and Placing the Oven

⚠ WARNING: Oven weight is approximately 157 lbs. (71 kg). Two or more persons are required to lift it.

⚠ WARNING: To prevent personal injury or damage to the oven DO NOT lift the oven from the front and rear or by the handle.

⚠ WARNING: The operator must ensure that the oven is properly placed on the table or countertop at all times. TurboChef will not recognize a fallen oven as a warrantable claim and is not liable for any injuries that may result.

When lifting and placing the oven:

1. Position one or more persons on left and right sides of oven.

2. Lift from bottom of oven.

3. Place oven on surface at least 30″ (762 mm) deep and capable of supporting 167 lbs (76 kg).

Setup

Once oven is properly positioned on the counter:

1. Remove packing material and/or foreign objects from within Cook Chamber.

2. Install Oven Rack by placing it over support pins.

3. Plug in oven to appropriate electrical outlet.

Operating the Oven

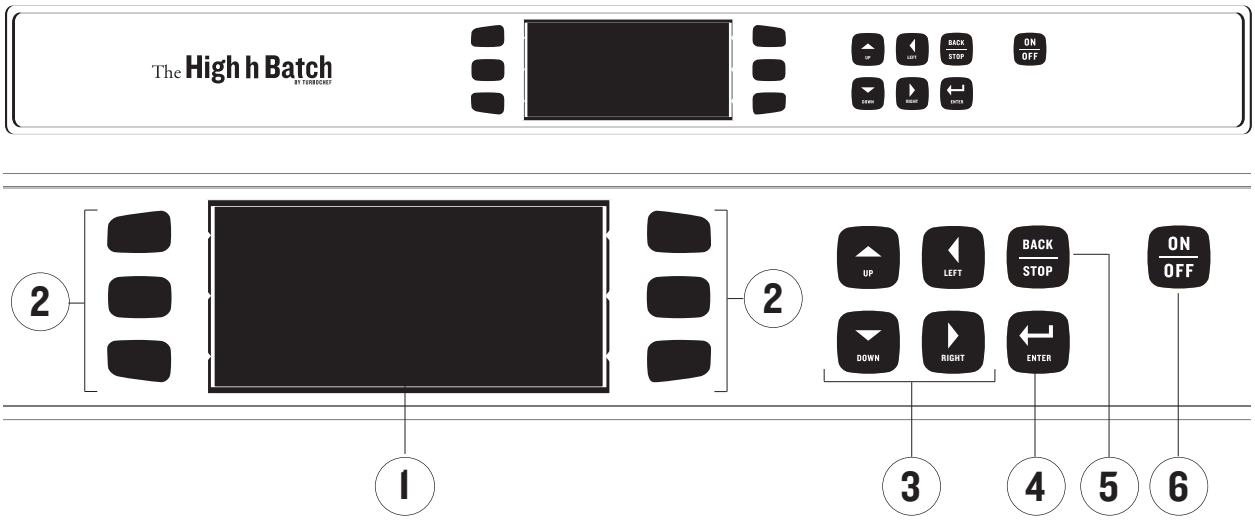


FIGURE 2: High h Batch Keypad

This section contains information on:
- Control Display and Key Identification
- Powering up
- Powering down
- Cooking Instructions
- Cooking Options
- Programming Recipes
- Using the Options Menu

CONTROL DISPLAY AND KEY IDENTIFICATION

Reference Figure 2.

1. Display

Displays operational information.

2. Soft keys

Six (6) keys used for different functions depending on what is adjacently displayed.

3. Directional keys

Allow user to navigate menus and adjust incremental settings.

4. Enter key

Used to save edited information.

5. Back/Stop key

Press to stop a Cook Cycle or to return to a previous screen.

6. On/Off key

Turns the oven on and off.

OVEN STATES AND MENU ACCESS

(Reference Figure 3, page 6)

Oven State Descriptions

1. Warm-up
   State during which the oven warms itself to the predetermined Cook Chamber temperature.

2. Ready to Cook
   The oven is "ready to cook" when it has warmed up to the preset Cook Chamber temperature. At this point, the operator can enter cook commands via the keypad.

3. Cool-down
   State during which the Blower Motor blows cool air into the Cook Chamber until the temperature is below 150ºF (66°C). This takes approximately 90 minutes.

4. Off
   Cooking components are off and Cook Chamber temperature is below 150ºF (66°C), but Control System remains operational.

Menu Descriptions

1. Edit Menu
   Menu from which operator/technician can modify Cook Chamber temperature, recipes, and recipe settings.

2. Options Menu
   Menu from which operator can enable/disable various operative functions.

3. Recipe Menu (or "Menu")
   Highest superset of recipes, the menu consists of 12 food groups of 6 recipes, or 72 recipes total.

4. Test Mode Menu
   Menu from which technician can run diagnostics and check statistics in test mode.

POWERING UP

To turn on the oven, press the "ON/OFF" Key. The oven will begin to warm up to its predefined cooking temperature (typically 500ºF (260ºC)). This takes approximately 10 minutes.

When the Warm-up Cycle is completed, the oven will beep and display "READY TO COOK." Within a few seconds, the oven will display food groups from which to select a food item.

POWERING DOWN

To turn off the oven, press the "ON/OFF" Key. Total cool down time is approximately 90 minutes.

NOTE: To expedite the cooling process, open the Oven Door.

⚠ WARNING: The oven door is hot. To prevent possible burns, ensure that the door is not blocking a throughway or aisle when opened to expedite cooling process.

COOKING INSTRUCTIONS

Recipes have developed and programmed into the oven, depending on the customer's request.

To select a recipe and initiate a Cook Cycle:

1. Press the "ON/OFF" Key to turn the oven on. The oven will start warming up.

2. Once the oven reaches its predetermined cook temperature (typically 500°F (260°C)), it will display a menu.

3. Carefully place the food item to be cooked in the Cook Chamber.

⚠ WARNING: Inside of oven is HOT and could result in injury.

4. To select a food group, press the corresponding Soft Key (Figure 4)

   NOTE: Press the "DOWN" Key to view food groups 7–12.

OVEN STATE	ACCESS TO:			
	Edit Menu	Options Menu	Recipe Menu	Test Mode Menu
Warm-up	NO	NO	NO	NO
Ready to Cook	NO	NO	YES	NO
Cool-down	YES	YES	NO	YES
Off	YES	YES	NO	YES

FIGURE 3: Oven State/Menu Access Table

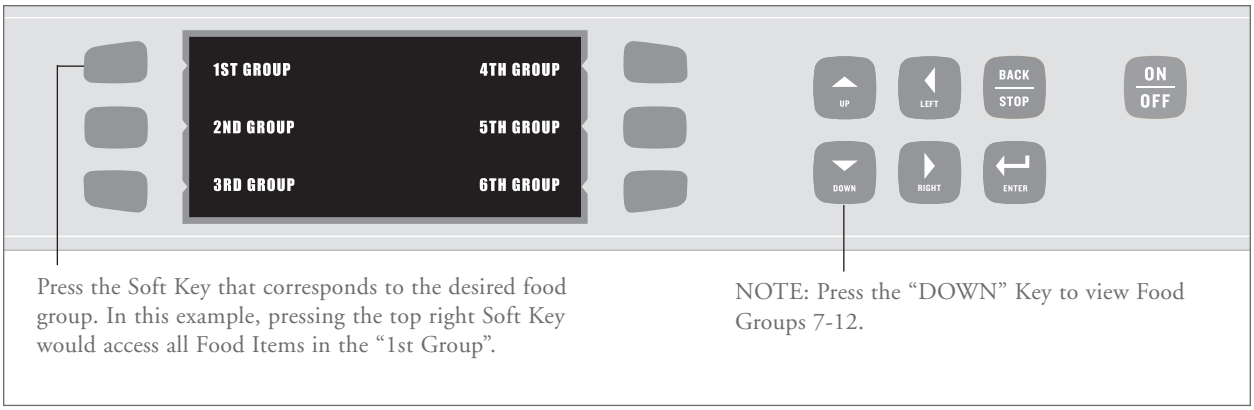


FIGURE 4: Selecting a Food Group

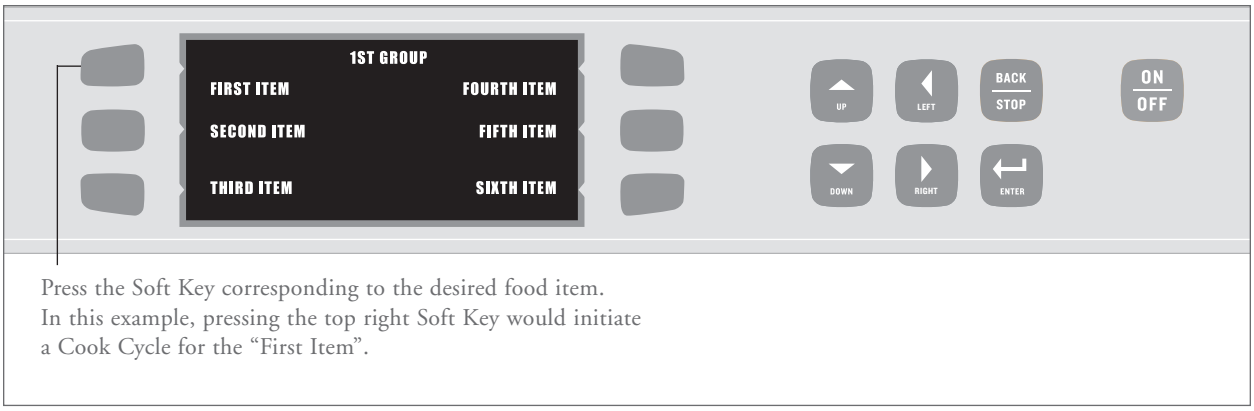


FIGURE 5: Selecting a Food Item

5. Each of the 12 food groups contains 6 food items (recipes). Select a recipe by pressing the corresponding Soft Key (Figure 5).

NOTE: To immediately terminate a Cook Cycle, press the "BACK/STOP" Key.

COOKING OPTIONS

Time Screen Options (Figure 6, page 8)

If the Time Screen is enabled, before initiating a Cook Cycle the operator will be given the option to adjust the cook time in 5-second increments. To learn about enabling and disabling the Time Screen, see page 10.

Done Screen Options (Figure 7, page 8)

If the Done Screen is enabled, when the operator opens the door at the end of a Cook Cycle he/she will be given two (2) choices:

1. Save Time – save an adjusted cook time (if Time Screen is also enabled).
2. Cook More – cook an item longer after it reaches the end of its Cook Cycle.

When an item is cooked longer, the oven cooks it to the specifications of the final event in the initial Cook Cycle. To learn about events (or phases) of a recipe, see Modifying Recipes (pages 12-14).

To learn about enabling and disabling the Done Screen, see page 10.

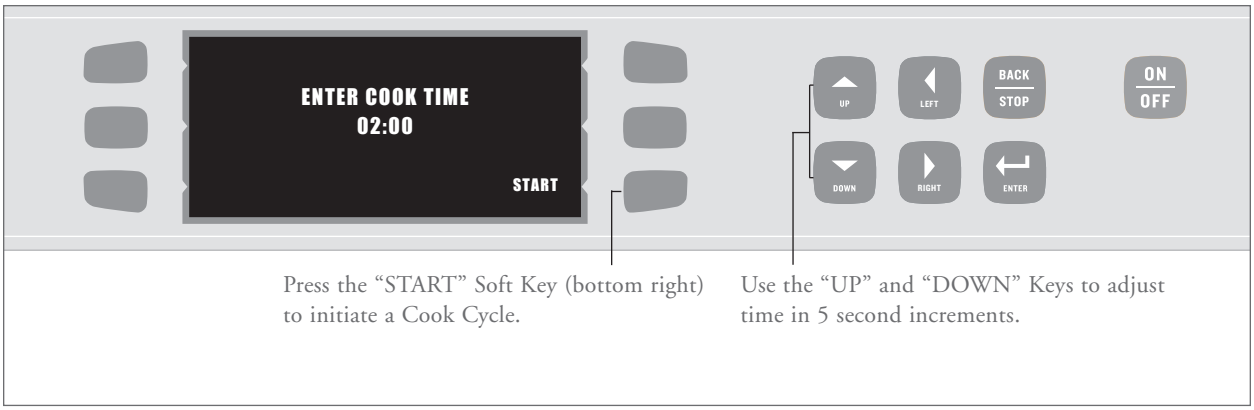


FIGURE 6: Time Screen

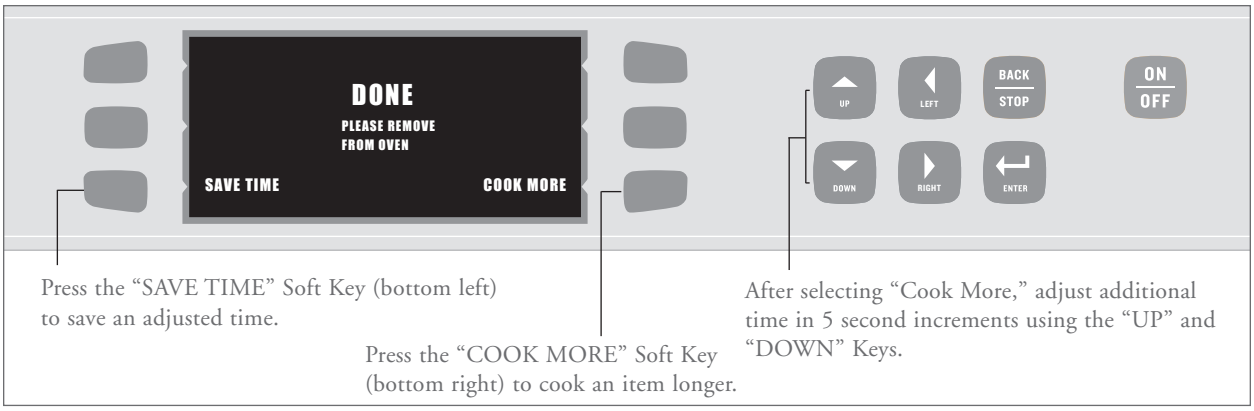


FIGURE 7: Done Screen

USING THE OPTIONS MENU

Use the Options Menu to:

- Enable/disable the Edit Menu
- Erase Recipe Menu
- Enable/disable the Write Card Function
- Enable/disable the Time Screen
- Enable/disable the Done Screen
- Enable/disable Demonstration Mode

To access the Options Menu:

1. Ensure the oven is in either Cool-down State or Off State.

2. Simultaneously press and hold top left and top right Soft Keys for 5 seconds.

Enabling/Disabling Edit Menu (Figure 8)

Enabling the Edit Menu allows operators to modify Cook Chamber temperature, recipes, and recipe settings. Disabling the Edit Menu prevents operators from accessing these options.

By default, the Edit Menu is enabled unless otherwise requested by the customer.

To enable/disable the Edit Menu:

1. From the Options Menu, press the "EDIT MENU" Soft Key (top left) to turn the Edit Menu on or off.

2. Press the "BACK/STOP" Key to exit the Options Menu.

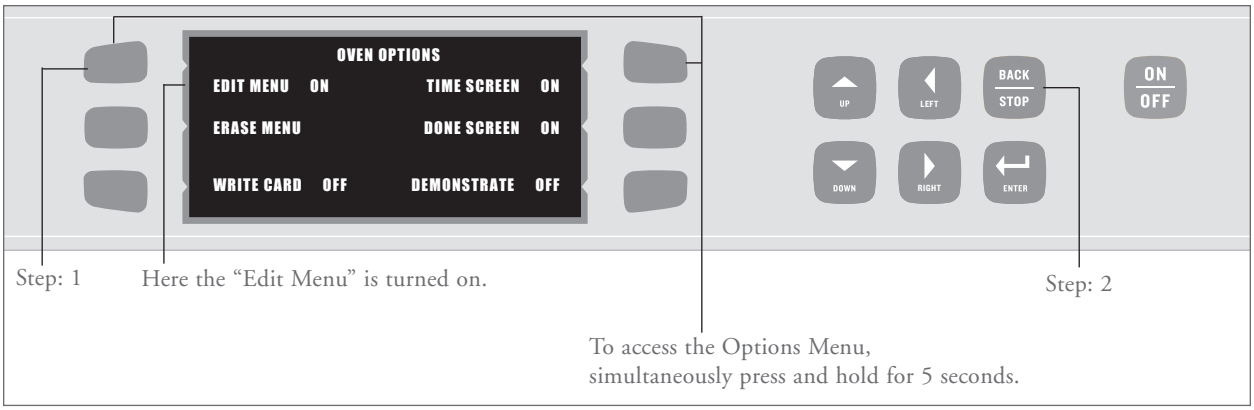


FIGURE 8: Enabling/Disabling the Edit Menu

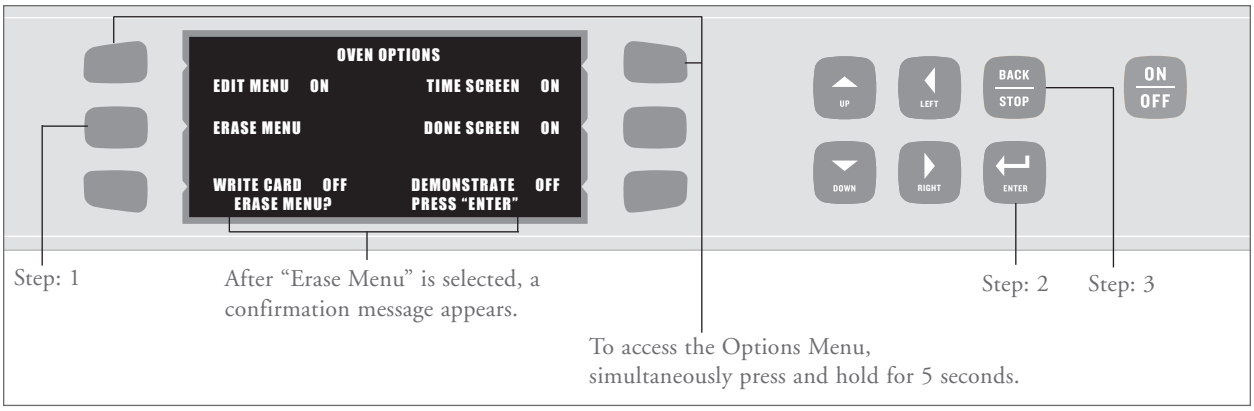


FIGURE 9: Erasing the Menu

Erasing the Recipe Menu (Figure 9)

Erasing the Recipe Menu will permanently delete currently-stored recipes and recipe settings.

To erase the menu:

1. From the Options Menu, press the "ERASE MENU" Soft Key (middle left) to erase menu.

2. Press the "ENTER" Key to confirm or the "BACK/STOP" Key to cancel.

3. Press the "BACK/STOP" Key to exit the Options Menu.

Enabling/Disabling the Write Card Function (Figure 10, page 9)

Enabling the Write Card function allows operators to save recipes from the oven to a Smart Card. Disabling the Write Card function prevents operators from doing so.

By default, the Write Card function is disabled unless otherwise requested by the customer.

To enable/disable the Write Card function:

1. From the Options Menu, press the "WRITE CARD" Soft Key (bottom left) to turn the Write Card function on or off.

2. Press the "BACK/STOP" Key to exit the Options Menu.

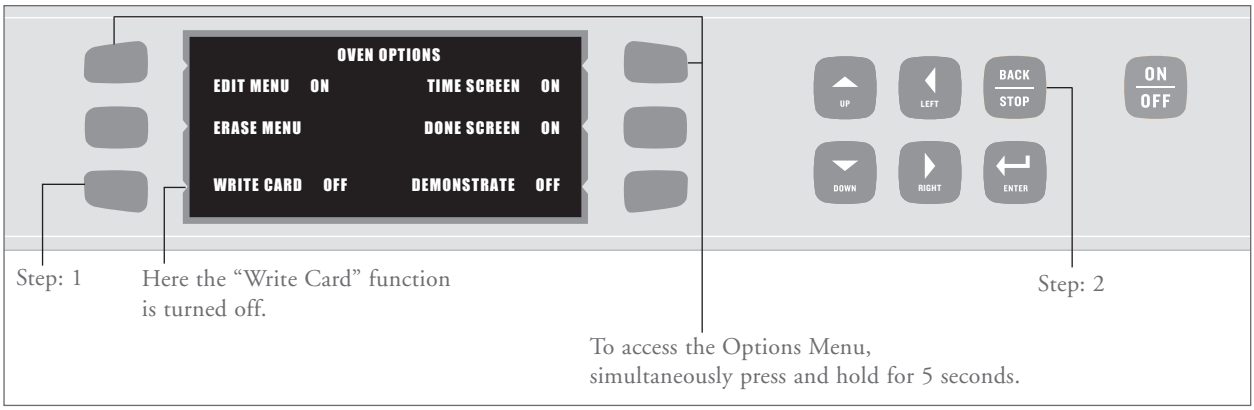


FIGURE 10: Enabling/Disabling the Write Card Function

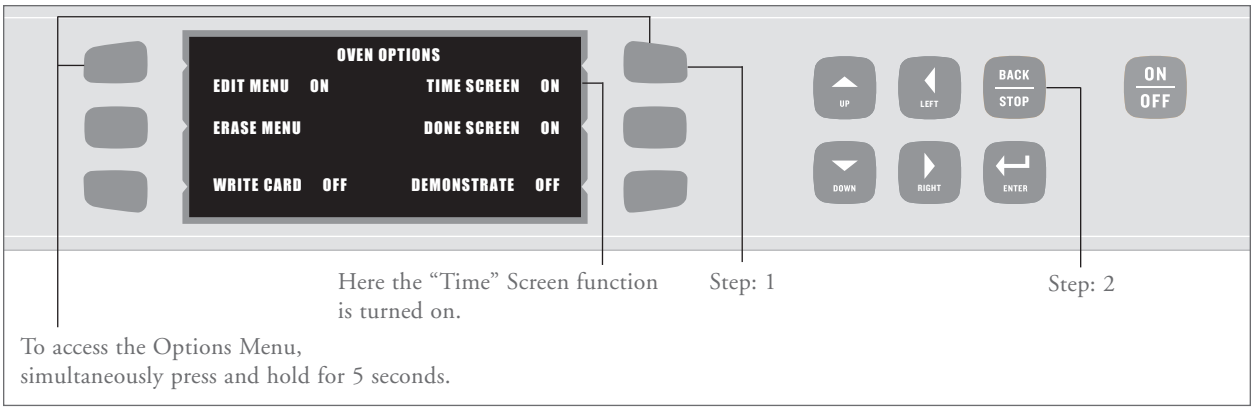


FIGURE 11: Enabling/Disabling the Time Screen

Enabling/Disabling Time Screen (Figure 11)

Enabling the Time Screen function allows the operator to adjust the Total Cook Time before initiating a Cook Cycle. Disabling it prevents the operator from doing so and helps ensure originally-programmed cook times remain unaltered.

By default, the Time Screen is enabled unless otherwise requested by the customer.

To enable/disable the Time Screen:

1. From the Options Menu, press the "TIME SCREEN" Soft Key (top right) to turn the Time Screen function on or off.

2. Press the "BACK/STOP" Key to exit the Options Menu.

Enabling/Disabling Done Screen (Figure 12)

Enable the Done Screen to:

- Save an adjusted cook time
- Cook an item longer after it reaches the end of its Cook Cycle

Disabling it prevents the operator from doing the above and helps ensure all originally programmed cook times remain unaltered.
By default, the Done Screen is enabled unless otherwise requested by the customer.

To enable/disable the Done Screen:

1. From the Options Menu, press the "DONE SCREEN" Soft Key (middle right) to turn the Done Screen function on or off.

2. Press the "BACK/STOP" Key to exit the Options Menu.

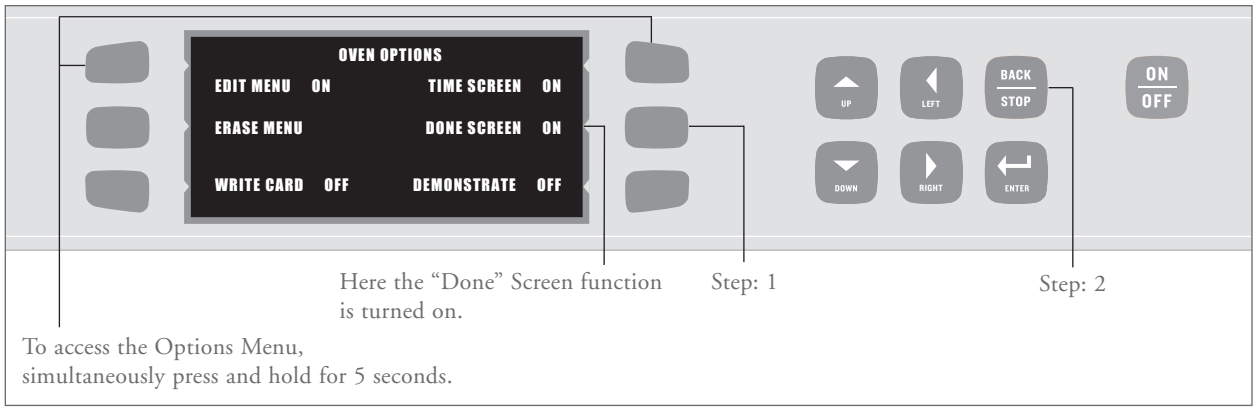


FIGURE 12: Enabling/Disabling the Done Screen

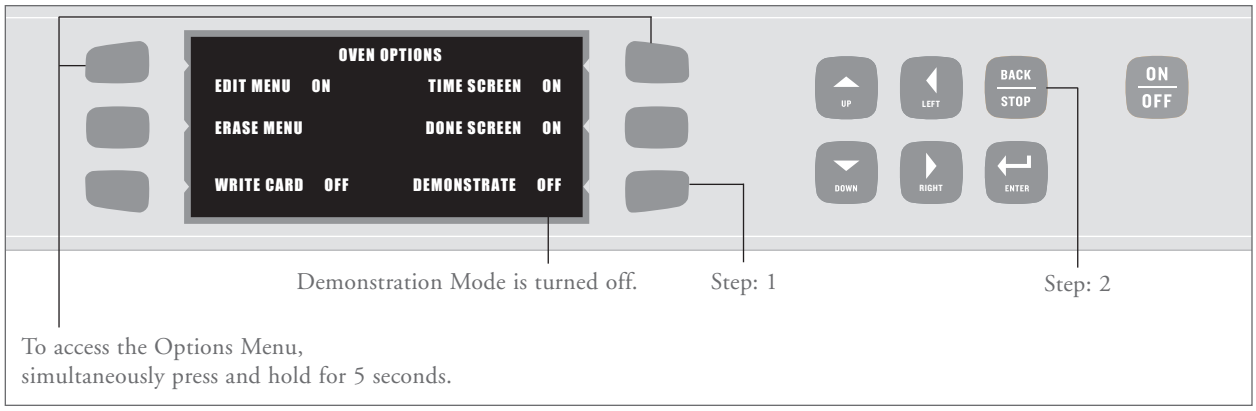


FIGURE 13: Enabling/Disabling the Demonstration Mode

Enabling/Disabling Demonstration Mode (Figure 13)

Enabling Demonstration Mode allows the operator to view/show every operational aspect of the oven without the oven actually heating up.

By default, the Demonstration Mode is disabled unless otherwise requested by the customer.

To enable/disable Demonstration Mode:

1. From the Options Menu, press the "DEMONSTRATE" Soft Key (bottom right) to turn the Demonstration Mode on or off.

2. Press the "BACK/STOP" Key to exit the Options Menu.

PROGRAMMING RECIPES

Programming options include:

- Adjusting the Cook Chamber Temperature
- Modifying Recipes
- Loading a Menu from a Smart Card
- Saving a Menu to a Smart Card
- Checking the Recipe Counter

To program recipes, the oven must be in either the Cool-down State or Off State.

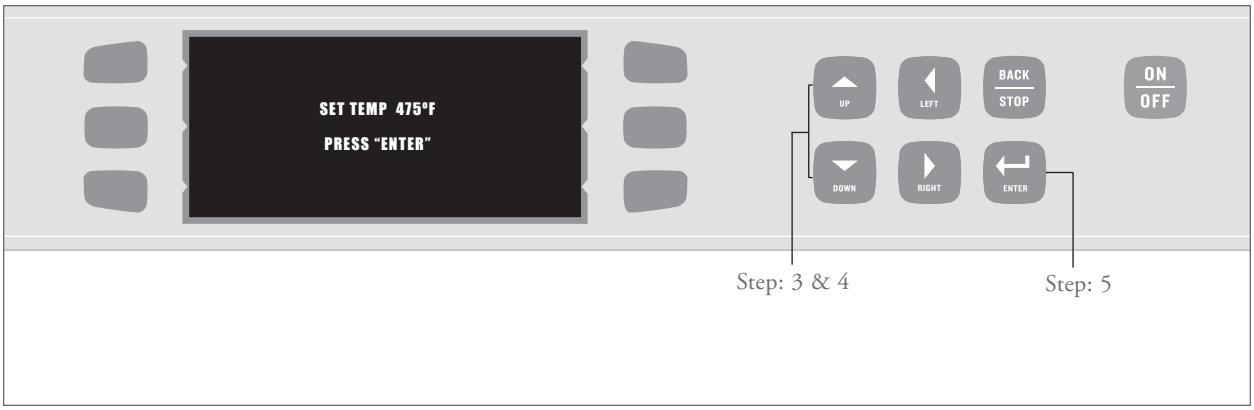


FIGURE 14: Adjusting the Cook Chamber Temperature

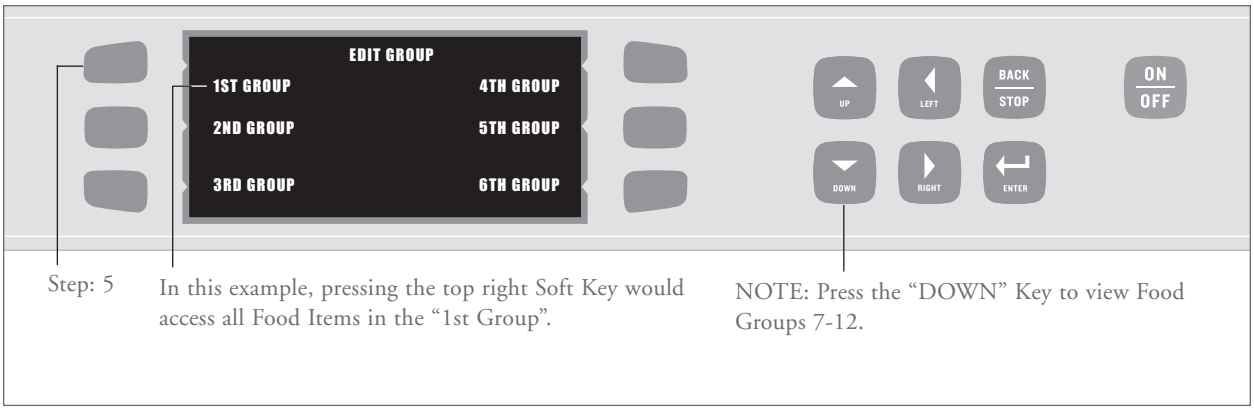


FIGURE 15: Modifying Recipes – Step 5

Adjusting the Cook Chamber Temperature (Figure 14)

1. Ensure oven is in either the Off State or Cool-down State.

2. Verify Edit Menu is enabled (for instructions see page 8).

3. Simultaneously press and hold the "UP" and "DOWN" Keys for 1 second.

4. Adjust Cook Temperature in 25°F (15°C) increments by using the "UP" and "DOWN" Keys.

5. Press "ENTER" Key to verify selection or press the "BACK/STOP" Key to cancel.

NOTE: Pressing the "ENTER" Key will open the next menu – modifying recipes. If you do not wish to modify recipes, simply press the "BACK/STOP" Key to exit the Options Menu.

Modifying Recipes (Figures 15-18)

The Recipe function of the High h Batch speed oven maximizes cooking efficiency by allowing the operator to preset cooking specifications for up to 72 items on his/her menu. The High h Batch stores these menu items into twelve Food Groups, each containing six Food Items (recipes).

NOTE: To erase all recipes and recipe settings, see Erasing Recipe Menu, page 9.

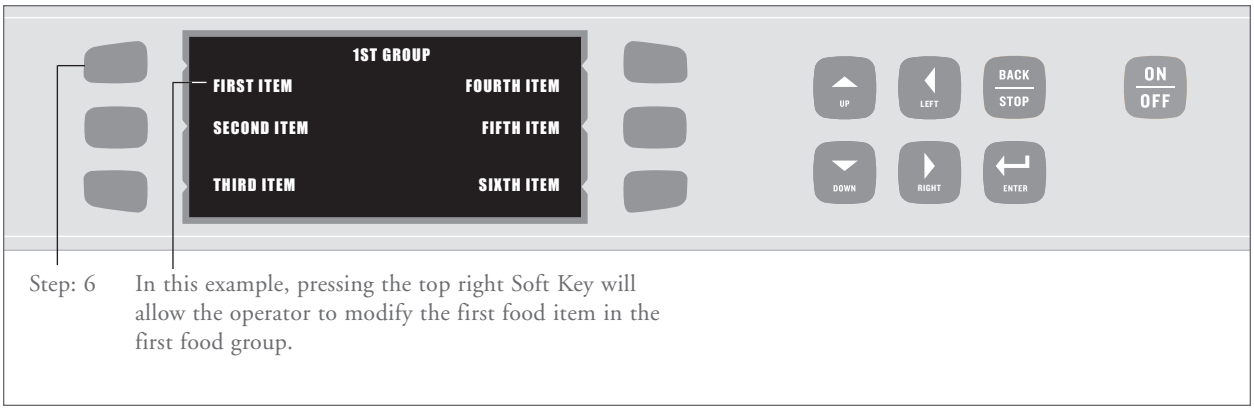


FIGURE 16: Modifying Recipes – Step 6

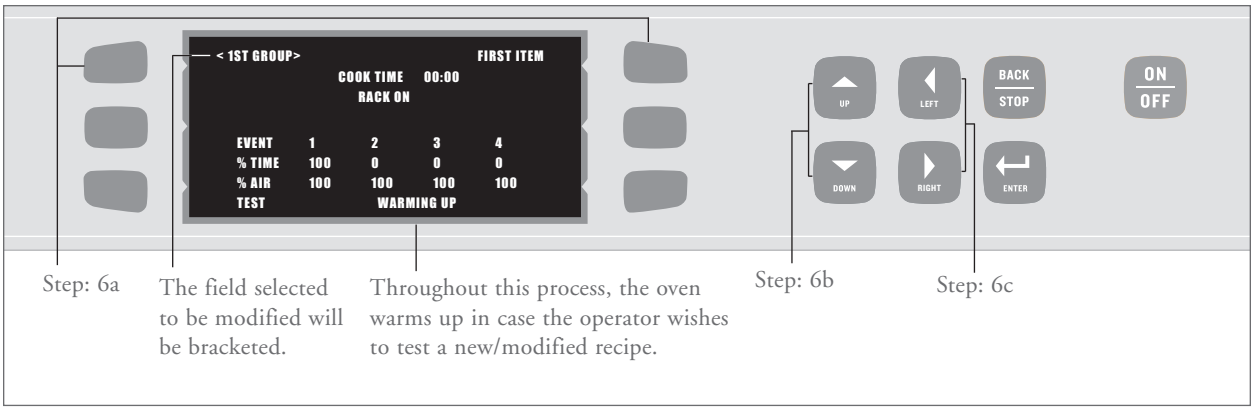


FIGURE 17: Navigating the Food Item Menu

To modify a food item:

1. Ensure oven is in either the Off State or Cool-down State.

2. Verify Edit Menu is enabled (for instructions, see page 8).

3. Simultaneously press and hold the "UP" and "DOWN" Keys for 1 second.

4. Adjust the cook temperature in 25°F (15°C) increments by using "UP" and "DOWN" Keys. To verify selection (or to proceed without changing the cook temperature), press the "ENTER" Key.

5. Select the Food Group that contains the item to be modified (Figure 15).

6. Select Food Item to be modified (Figure 16).

NOTE: To learn how to navigate the Food Item Menu (Figure 17), review the following:

a. To navigate characters (numbers and letters within a field), use the top left and top right Soft Keys.

b. To change characters, use the "UP" and "DOWN" Keys. Press and hold these keys to rapidly scroll through characters.

NOTE: Pressing the "UP" and "DOWN" Keys will clear the field of its current content UNLESS you first press either the top left or top right Soft Key.

c. Use the "LEFT" and "RIGHT" Keys to navigate fields.

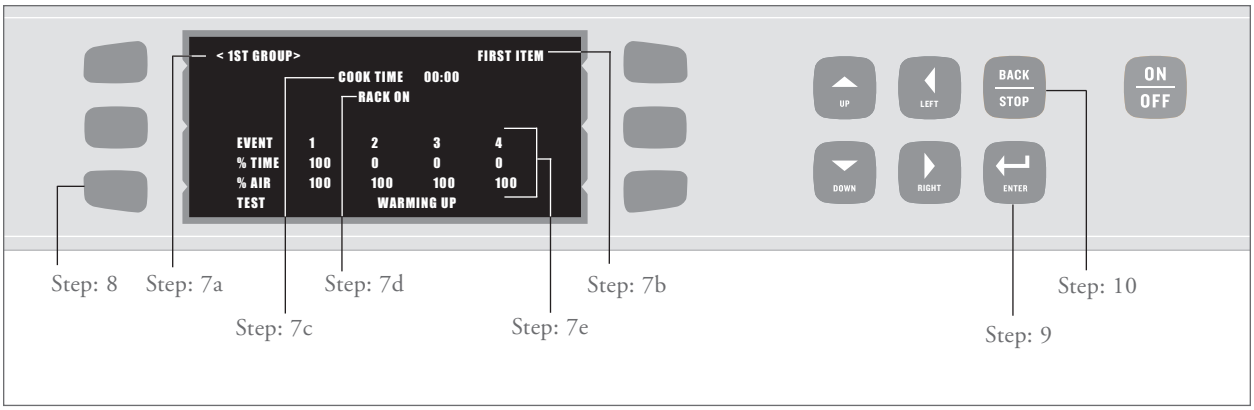


FIGURE 18: Modifying Recipes – Steps 7-10

7. From "Food Item" Screen (Figure 18, page 14), the operator can:
   a. Enter/change food group name.

   b. Enter/change food item name.

   c. Set cook time by using the "UP" and "DOWN" Keys (5-second increments).

   d. Choose whether to turn rack on or off by using the "UP" and "DOWN" Keys.

   e. Specify Events, which allow each food item to cook in different phases at different air levels.
      - Enter percentage of cook time per event (total must equal 100%).
      - Enter percentage of air per event (10% increments).

8. To test settings before saving, press bottom left Soft Key. Oven will initiate a Cook Cycle to the specifications of new settings.

9. To save settings, press "ENTER" Key until SETTINGS SAVED is displayed (can be up to three (3) times before SETTINGS SAVED displays).

10. Press the "BACK/STOP" Key 3 times to exit the menu (doing so before saving settings will erase changes).

Loading Menu from Smart Card (Figures 19 and 20)

⚠ CAUTION: Loading a menu from a Smart Card will overwrite all existing recipes programmed into the oven.

To load a menu from a Smart Card:
1. Ensure oven is in either the Off State or Cool-down State.

2. Insert Smart Card into Smart Card Reader. Orient card as shown in Figure 19.

3. Press bottom left Soft Key.

4. Press middle left Soft Key to LOAD MENU FROM CARD (Figure 20).

5. Press the "ENTER" Key to confirm or the "BACK/STOP" Key to cancel. After approximately 5 seconds, screen will display that menu has loaded from card (Figure 20).

Saving Menu to Smart Card (Figures 19 and 21)

⚠ CAUTION: Saving a menu to a Smart Card will overwrite all existing recipes programmed into the Smart Card.

To save a menu to a Smart Card:
1. Ensure oven is in either the Off State or Cool-down State.

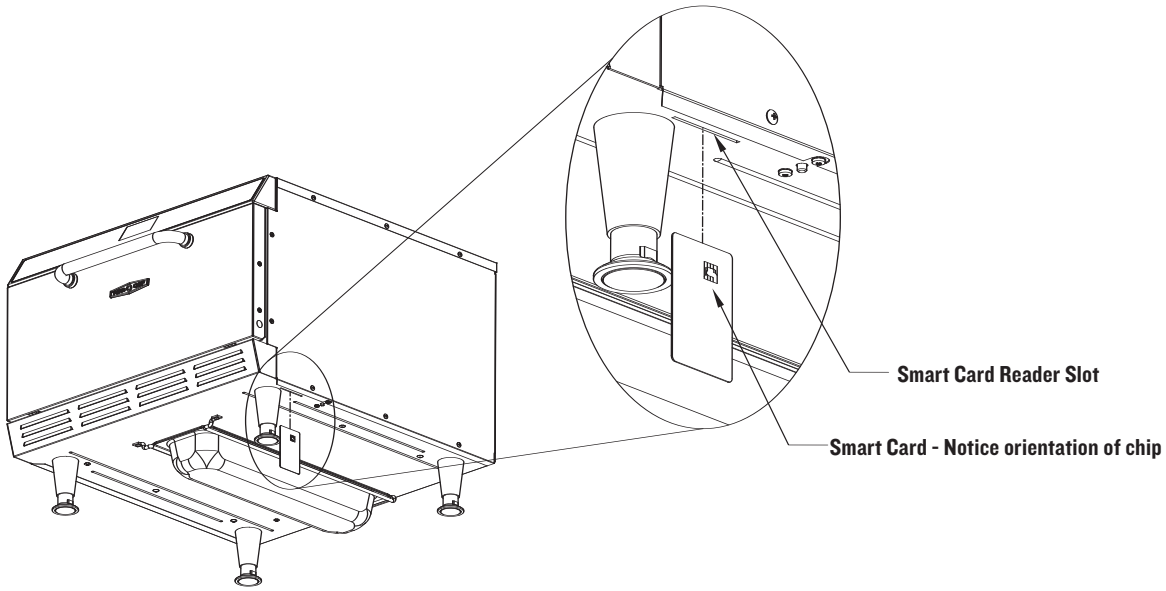


FIGURE 19: Inserting Smart Card into Reader

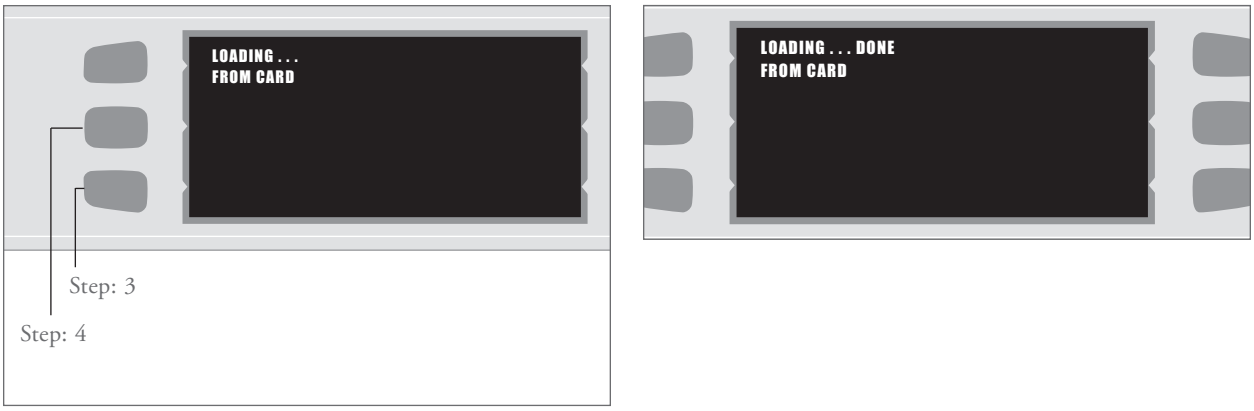


FIGURE 20: Loading from Smart Card

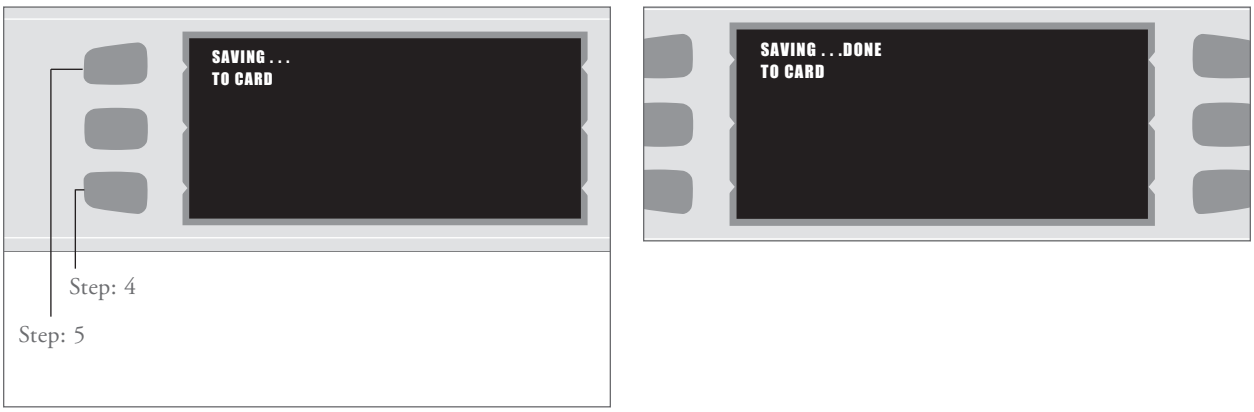


FIGURE 21: Saving to Smart Card

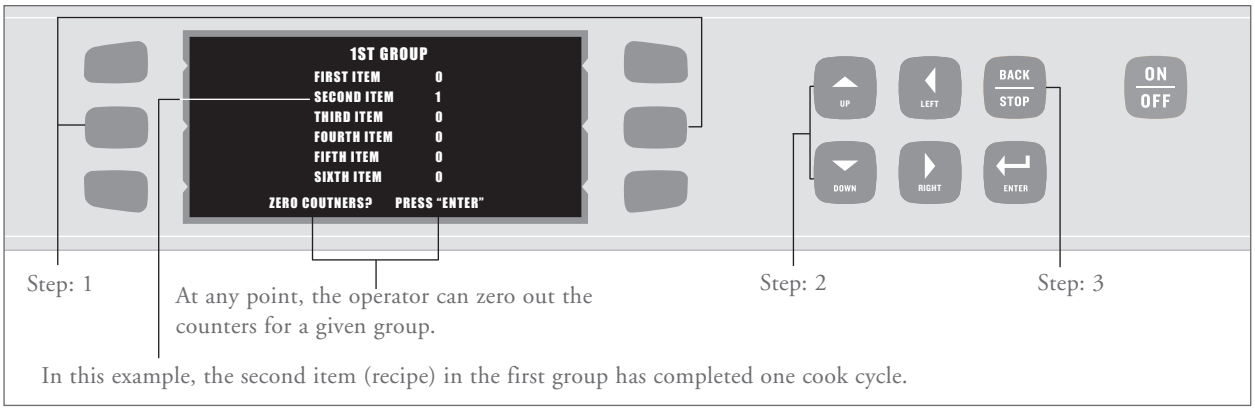


FIGURE 22: Checking the Recipe Counter

2. Verify Write Card function is enabled (for instructions, see page 9).

3. Insert Smart Card into Smart Card Reader Orient card as shown in Figure 19.

4. Press the bottom left Soft Key.

5. Press middle left Soft Key to SAVE MENU TO CARD (Figure 20).

6. Press the "ENTER" Key to confirm or the "BACK/STOP" Key to cancel. After approximately 5 seconds, screen will display that menu has saved to the card (Figure 21, page 15).

Checking Recipe Counter (Figure 22)

To view how many times each recipe (Food Item) has been used:

1. Simultaneously press and hold middle left and middle right Soft Keys for 3 seconds.

2. Screen will display food items in first food group. To view other food groups, use the "UP" and "DOWN" Key.

3. After viewing desired Food Items, press the "BACK/STOP" Key to exit the menu.

NOTE: To erase counters, press the "ENTER" Key when viewing the totals.

Diagnosing an Issue

To help in troubleshooting, this section contains information on

- Fault Codes: Descriptions, Clearing Instructions, and Troubleshooting
- Control Display and Key Identification
- Oven States and Menu Access
- Status Indicators
- Testing Options

FAULT CODES: DESCRIPTIONS, CLEARING INSTRUCTIONS, AND TROUBLESHOOTING

The High h Batch oven continually monitors and logs fault conditions. For instructions on viewing the Fault Log, see page 24.

The Fault Log

- Logs each fault up to 255 instances before rolling back to zero.
- Increments when a fault is detected, but does not decrement when the fault is cleared (whether through service or some other action).

Reference Figure 23 (below) to determine when (i.e., which oven state) a fault can occur.

F1: BLOWER (Blower Running Status Bad)

This fault will display when the Blower Motor Controller indicates no running status. The oven responds to this fault by terminating a Cook Cycle and/or reverting to the Off State. The oven will automatically attempt to restart every 2 seconds until the fault is cleared.

To clear this fault:

1. Turn the oven on. The Control System may be able to successfully restart the Blower Motor.

2. Test the Blower Motor from the Test Mode Menu (for instructions, see page 24).

Troubleshooting this fault:
To troubleshoot an F1 Fault, see the diagram on page 18.

F2: LOW TMP (Cook Temperature Low)

This fault will display if the Cook Chamber temperature is more than 84°F (47°C) below the set temperature after 5 seconds into a Cook Cycle.

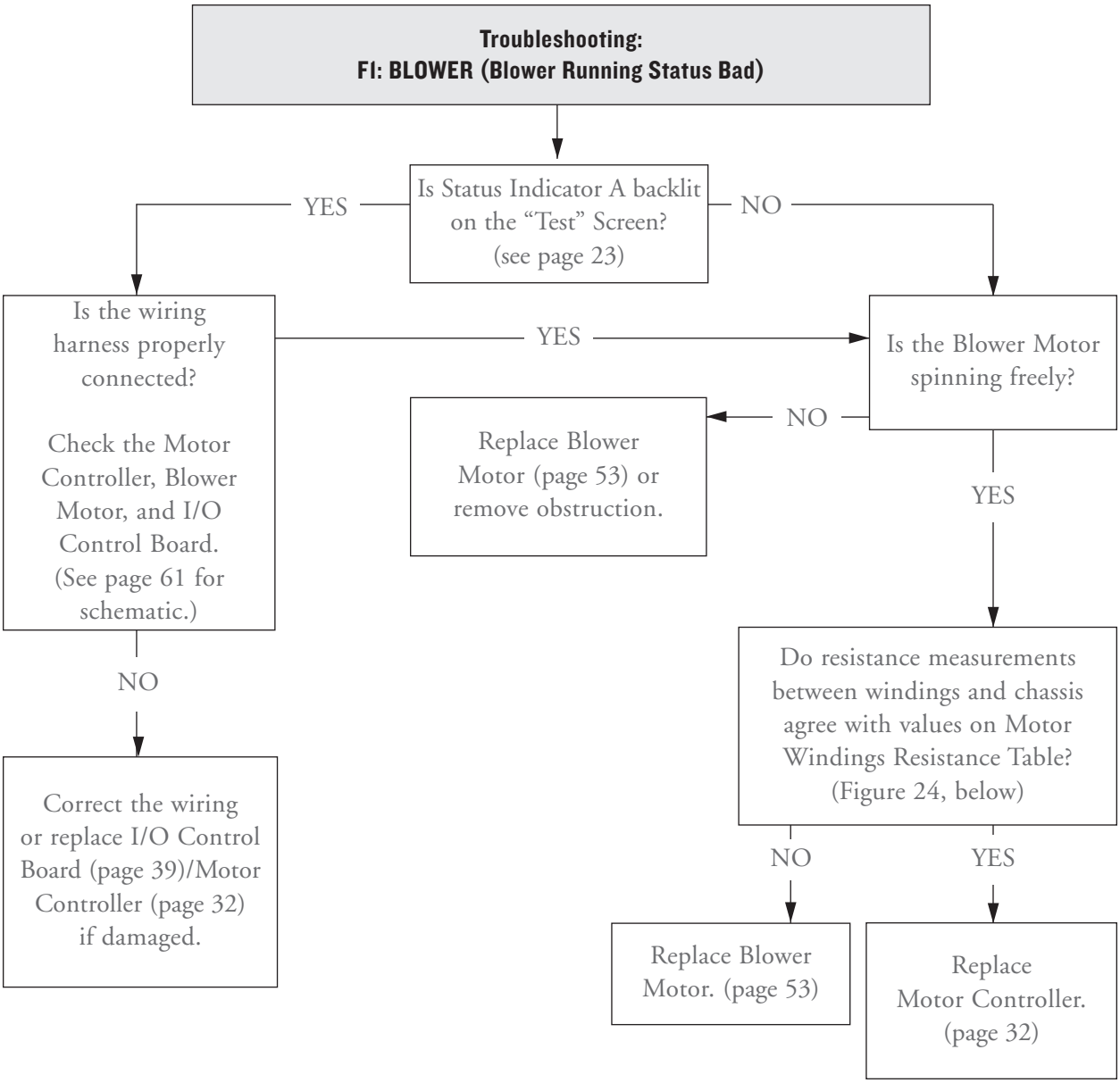
To clear this fault:
Try cooking again. If the Cook Chamber temperature is within 84°F (47°C) of the set temperature, the fault will clear.

Troubleshooting: F2 Fault
To troubleshoot an F2 Fault, see the diagram on page 19.

FAULT CODE AND DESCRIPTION	WHEN ACTIVE				REFER TO
	Warm-up	Ready to Cook	Cool Down	Off State	
F1: Blower Running Status Bad*	x	x	x	x	Page 17
F2: Cook Temperature Low*		x		x	Page 17
F6: EC Temperature High	x	x	x	x	Page 20
F7: Thermocouple Open	x	x		x	Page 20
F8: Heat Low	x			x	Page 20

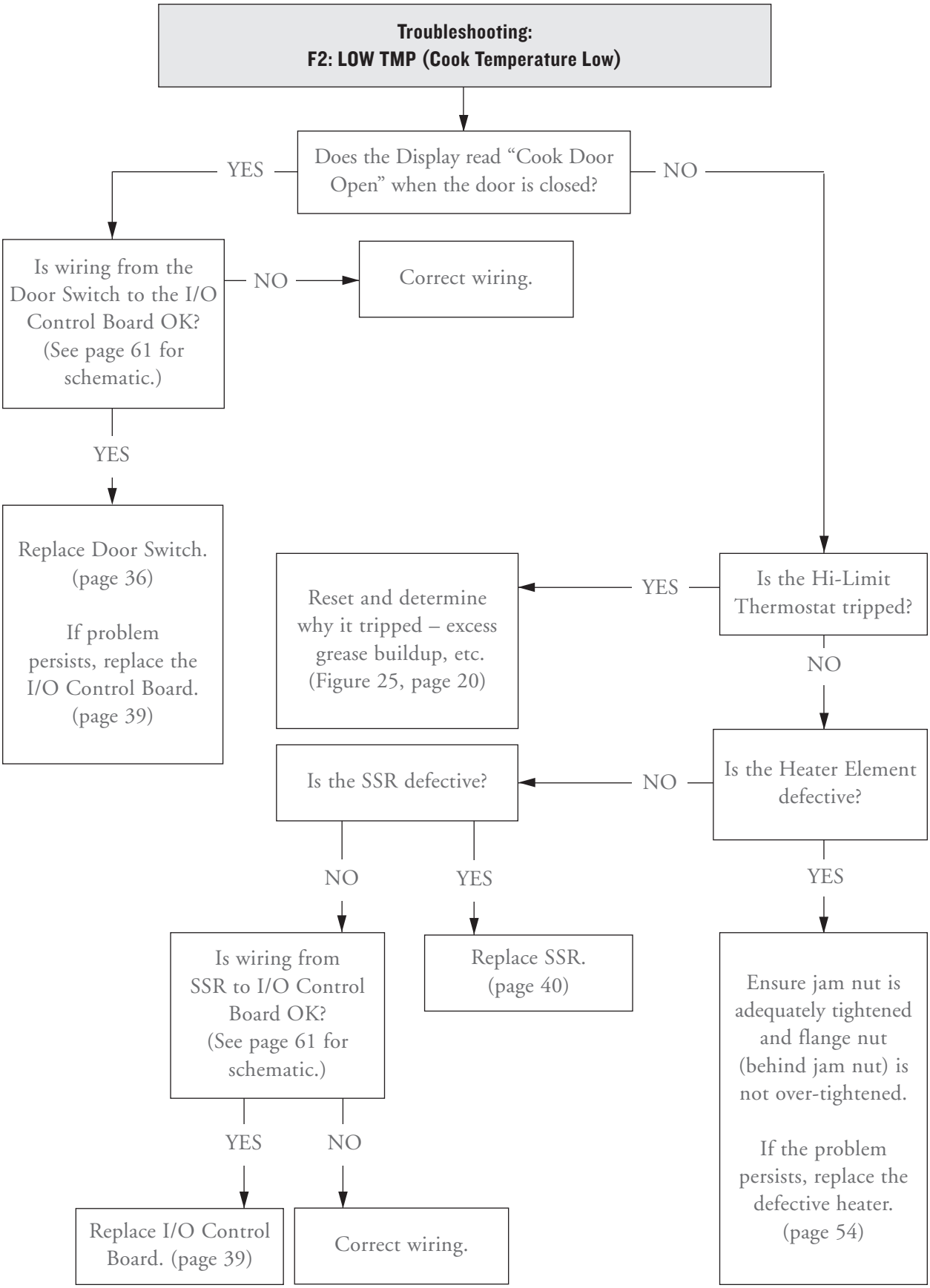
*Will terminate a Cook Cycle upon discovery.

FIGURE 23: Fault Code Description Table



TO	FROM	DESCRIPTION	EXPECTED RESISTANCE
Black	Red	Winding (A-B)	2.0-2.6 Ohms
Black	White	Winding (A-C)	2.0-2.6 Ohms
Red	White	Winding (B-C)	2.0-2.6 Ohms
Black, Red or White	Green	Windings to Chassis	Open

FIGURE 24: Motor Windings Resistance Table


Troubleshooting:
F2: LOW TMP (Cook Temperature Low)
Does the Display read "Cook Door Open" when the door is closed?
YES
NO
Is wiring from the Door Switch to the I/O Control Board OK? (See page 61 for schematic.)
NO
Correct wiring.
YES
Replace Door Switch. (page 36)
If problem persists, replace the I/O Control Board. (page 39)
Is the Hi-Limit Thermostat tripped?
YES
Reset and determine why it tripped – excess grease buildup, etc. (Figure 25, page 20)
NO
Is the Heater Element defective?
NO
Is the SSR defective?
NO
YES
Is wiring from SSR to I/O Control Board OK? (See page 61 for schematic.)
YES
NO
Replace I/O Control Board. (page 39)
Correct wiring.
YES
Replace SSR. (page 40)
YES
Ensure jam nut is adequately tightened and flange nut (behind jam nut) is not over-tightened.
If the problem persists, replace the defective heater. (page 54)

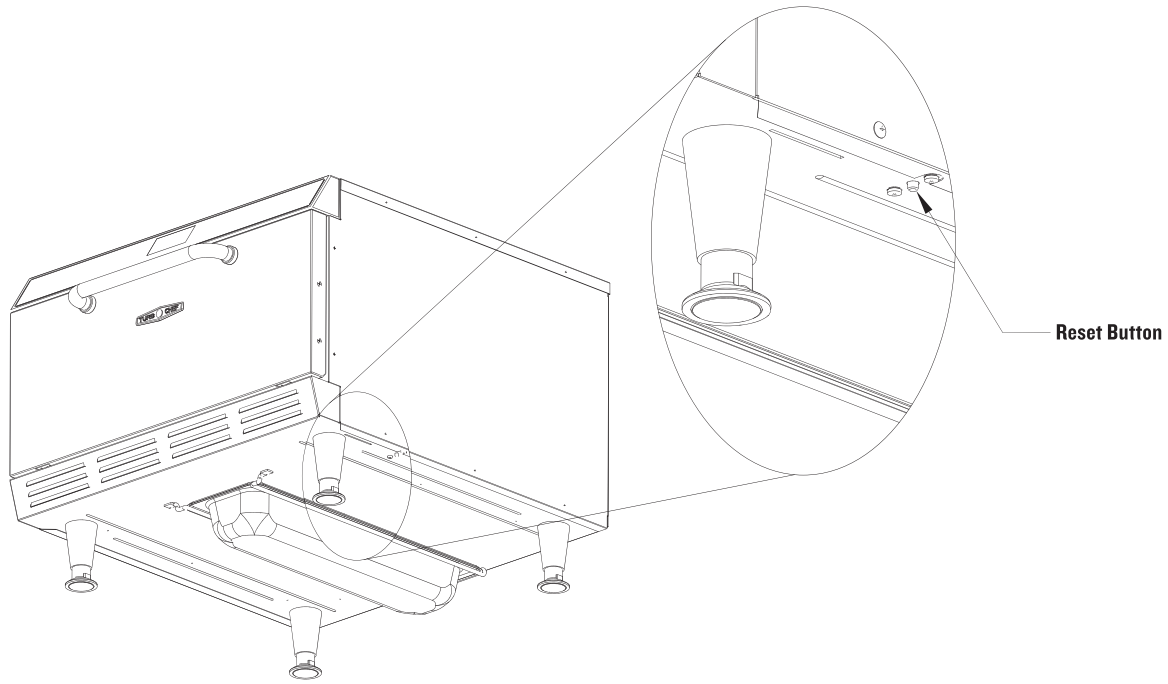


FIGURE 25: Location of Hi-Limit Thermostat Reset Button

F6: EC TEMP (Electrical Compartment (EC) Temperature High)
This fault displays if the Electrical Compartment (EC) temperature exceeds 158°F (70°C). The Control System checks the EC Thermocouple once per minute.

NOTE: This fault will not terminate a Cook Cycle.

To clear this fault:
The EC temperature must recede below 158°F (70°C).

Troubleshooting: F6 Fault
To troubleshoot an F6 Fault, see the diagram on page 21.

F7: THERMO (Thermocouple Open)
This fault will display if the Control System detects that the CC Thermocouple is "Open," or 999°F/C.

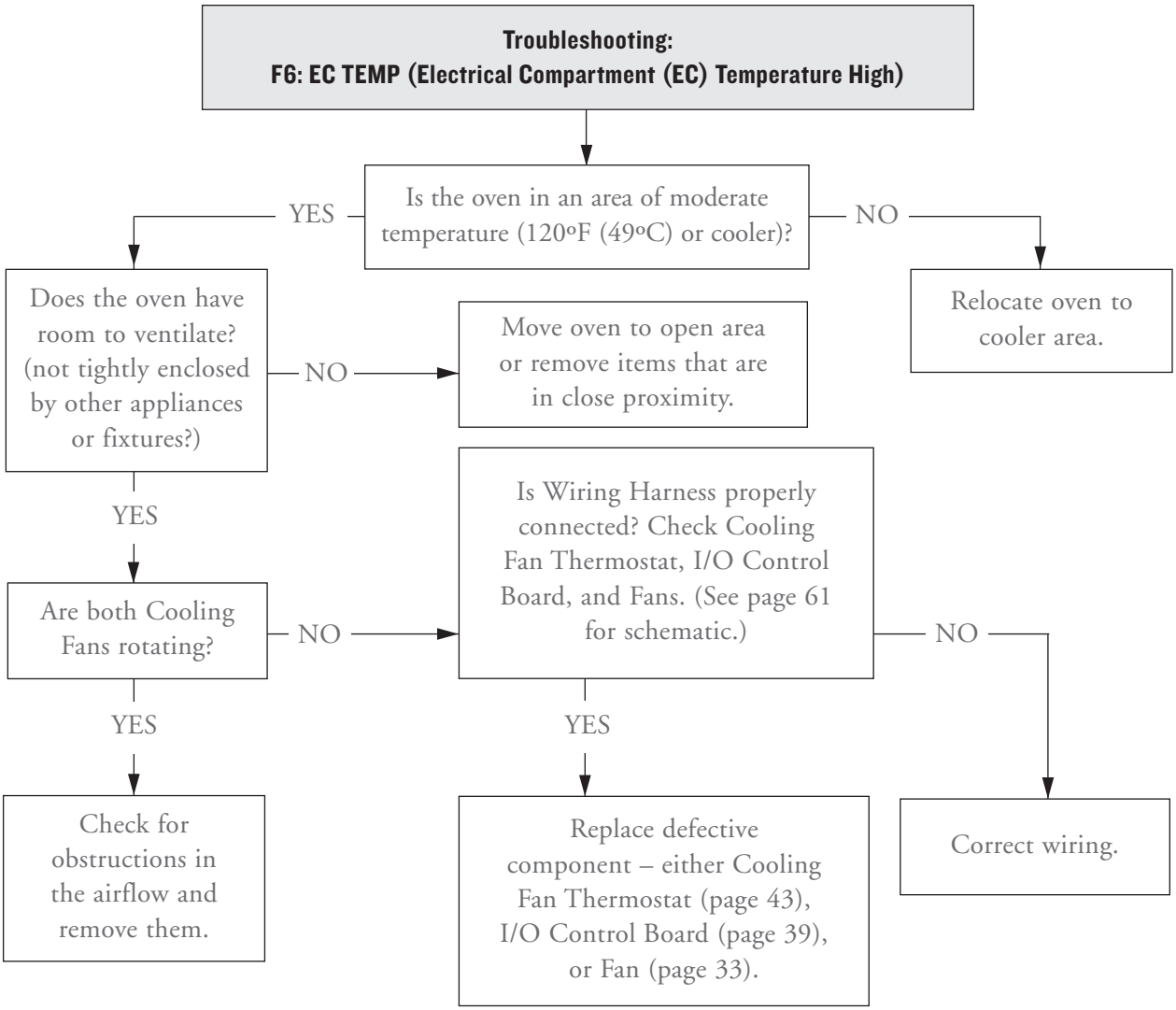
To clear this fault:
The Control System must detect continuity on the thermocouple circuit.

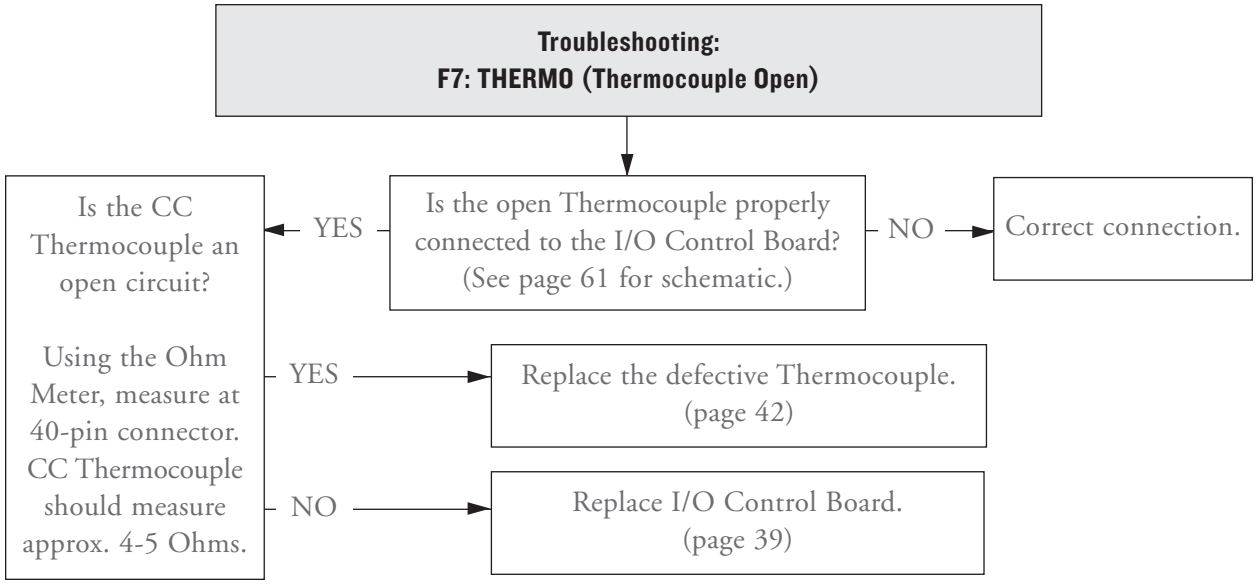
Troubleshooting: F7 Fault
To troubleshoot an F7 Fault, see the diagram on page 21.

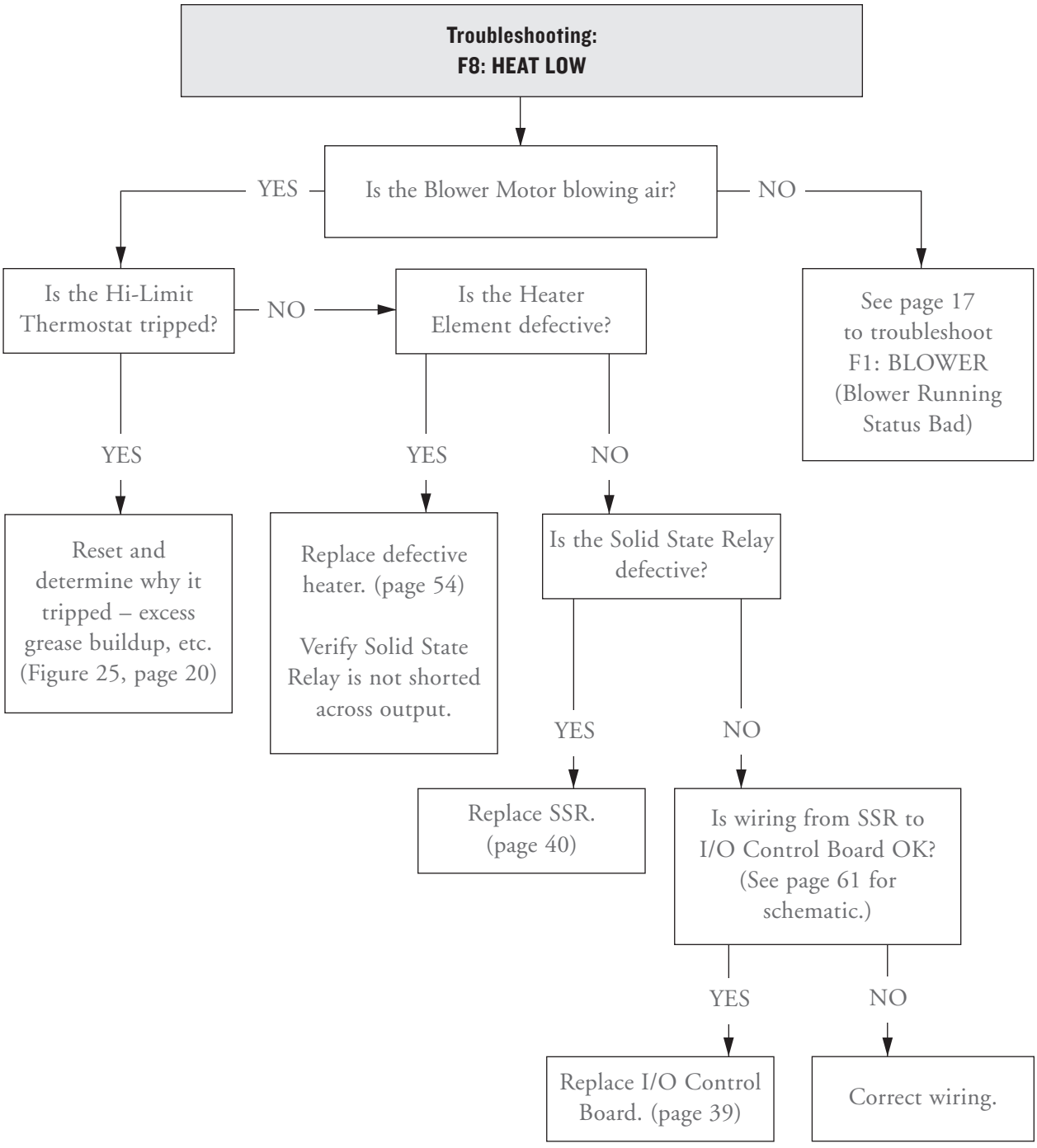
F8: HEAT LOW
This fault will display if during warm-up the Cook Chamber temperature fails to rise at least 35°F (approximately 18°C) every five minutes.

NOTE: This fault will not log; rather it will display an Error Message during warm-up.

Troubleshooting: F8 Fault
To troubleshoot an F8 Fault, see the diagram on page 22.


Troubleshooting:
F6: EC TEMP (Electrical Compartment (EC) Temperature High)
Is the oven in an area of moderate temperature (120ºF (49ºC) or cooler)?
YES
NO
Relocate oven to cooler area.
Does the oven have room to ventilate? (not tightly enclosed by other appliances or fixtures?)
NO
Move oven to open area or remove items that are in close proximity.
YES
Are both Cooling Fans rotating?
NO
Is Wiring Harness properly connected? Check Cooling Fan Thermostat, I/O Control Board, and Fans. (See page 61 for schematic.)
NO
YES
YES
Check for obstructions in the airflow and remove them.
Replace defective component – either Cooling Fan Thermostat (page 43), I/O Control Board (page 39), or Fan (page 33).
Correct wiring.


Troubleshooting:
F7: THERMO (Thermocouple Open)
Is the open Thermocouple properly connected to the I/O Control Board? (See page 61 for schematic.)
YES
NO
Correct connection.
Is the CC Thermocouple an open circuit?
Using the Ohm Meter, measure at 40-pin connector. CC Thermocouple should measure approx. 4-5 Ohms.
YES
Replace the defective Thermocouple. (page 42)
NO
Replace I/O Control Board. (page 39)


Troubleshooting:
F8: HEAT LOW
Is the Blower Motor blowing air?
YES
NO
Is the Hi-Limit Thermostat tripped?
NO
Is the Heater Element defective?
See page 17 to troubleshoot F1: BLOWER (Blower Running Status Bad)
YES
YES
NO
Reset and determine why it tripped – excess grease buildup, etc. (Figure 25, page 20)
Replace defective heater. (page 54)
Verify Solid State Relay is not shorted across output.
Is the Solid State Relay defective?
YES
NO
Replace SSR. (page 40)
Is wiring from SSR to I/O Control Board OK? (See page 61 for schematic.)
YES
NO
Replace I/O Control Board. (page 39)
Correct wiring.

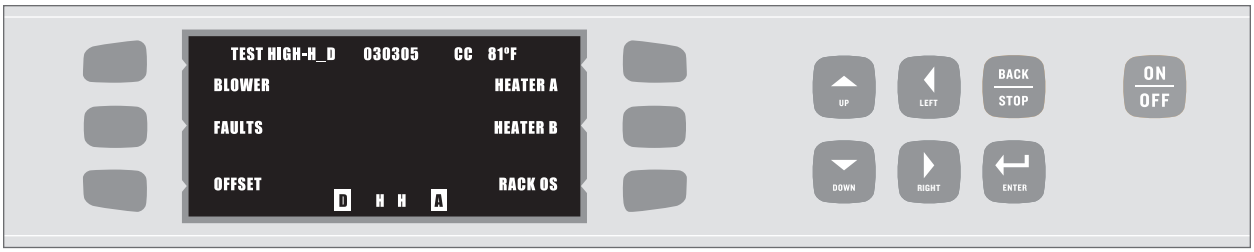


FIGURE 26: Test Mode Menu, Screen 1 of 2

STATUS INDICATORS

Displayed in Test and Diagnostic Modes, Status Indicators help in troubleshooting. The following oven parts are represented by letters at the bottom of the display (Figure 26).

Door (represented by "D")
Backlit = OPEN
Not backlit = CLOSED

Heater A (represented by left "H")
Backlit = OFF
Not backlit = ON

Heater B (represented by right "H")
Backlit = OFF
Not Backlit = ON

Blower (represented by "A" for "air")
Backlit = OFF
Not Backlit = ON

NOTE: In Figure 26, the door is open (the "D" is backlit), Heater A and B are on (neither "H" is backlit) and the Blower is off (the "A" is backlit).

TESTING OPTIONS

From the Test Mode Menu (Figure 26), a service technician can test/reference the following oven components:

- Blower Motor
- Fault Log
- Temperature Offset
- Heaters A & B
- Rack Oscillator
- Diagnostic Mode
- Cook Counter/Time
- Cumulative Operating Time
- Electrical Compartment Temperature
- Fahrenheit/Celsius Options
- Serial Number

To access the Test Mode Menu:

1. Ensure the oven is in the Off or Cool-down State.

2. Simultaneously press and hold the "Down" and "Right" Keys for 1 second.

NOTE: The Test Mode Menu contains two screens. Use the "UP" and "DOWN" Keys to toggle from screen to screen.

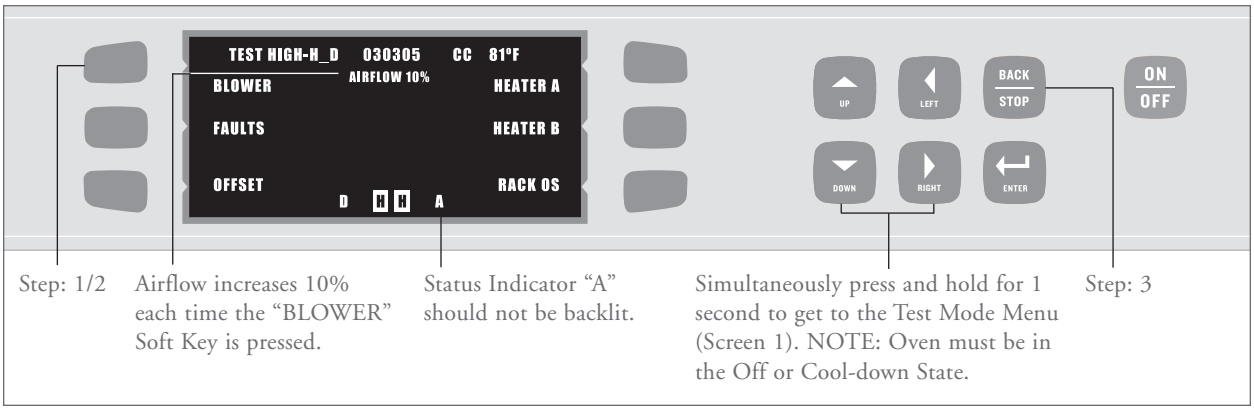


FIGURE 27: Testing the Blower Motor

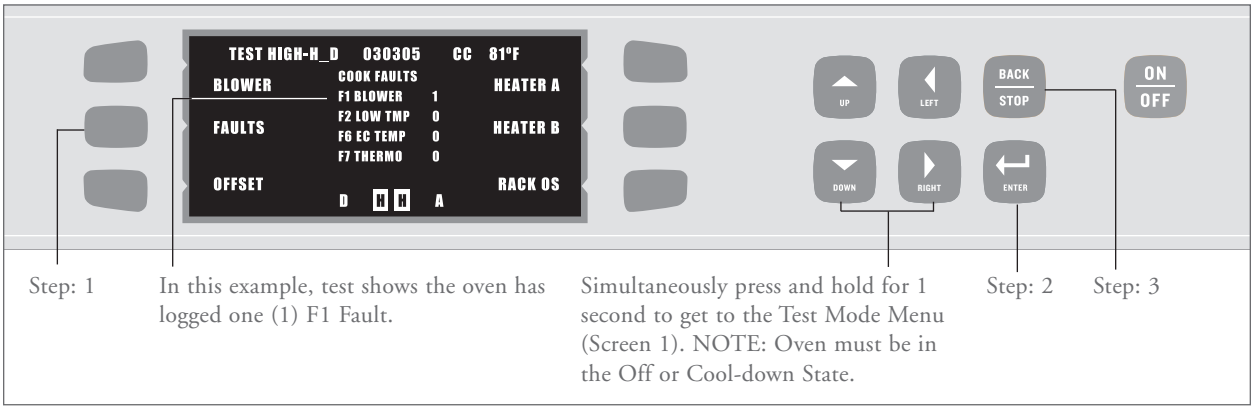


FIGURE 28: Viewing the Fault Log

Testing the Blower Motor (Figure 27)

1. From Screen 1 of the Test Mode Menu, press the "BLOWER" Soft Key (top left).

2. Continue pressing the "BLOWER" Soft Key (top left) to raise blower speed in 10% increments.

3. When finished, press the "BACK/STOP" Key to end the test and exit the Test Mode Menu.

Viewing/Clearing the Fault Log (Figure 28)

1. From Screen 1 of the Test Mode Menu, press the "FAULTS" Soft Key (middle left).

2. To zero-out the Fault Log, press the "Enter" key.

3. When finished, press the "BACK/STOP" Key to exit the Test Mode Menu.

Adjusting the Temperature Offset (Figure 29)

The Temperature Offset is a feature that ensures accurate temperature readings where the food actually cooks, as opposed to where the thermocouple is.

The value entered for temperature offset will deduct from the oven's temperature reading. For example, if the oven temperature = 500°F, and the temperature offset is 20°F, the oven will display 480°F.

To adjust the Temperature Offset:

1. From Screen 1 of the Test Mode Menu, press the "OFFSET" Soft Key (bottom left).

2. Continue pressing the "OFFSET" Soft Key to adjust the Temperature Offset in 5°F increments.

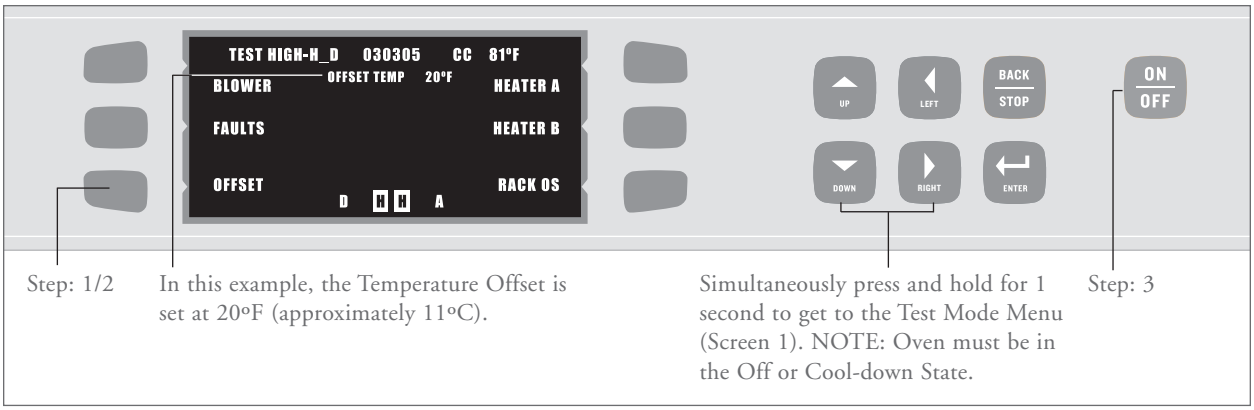


FIGURE 29: Adjusting the Temperature Offset

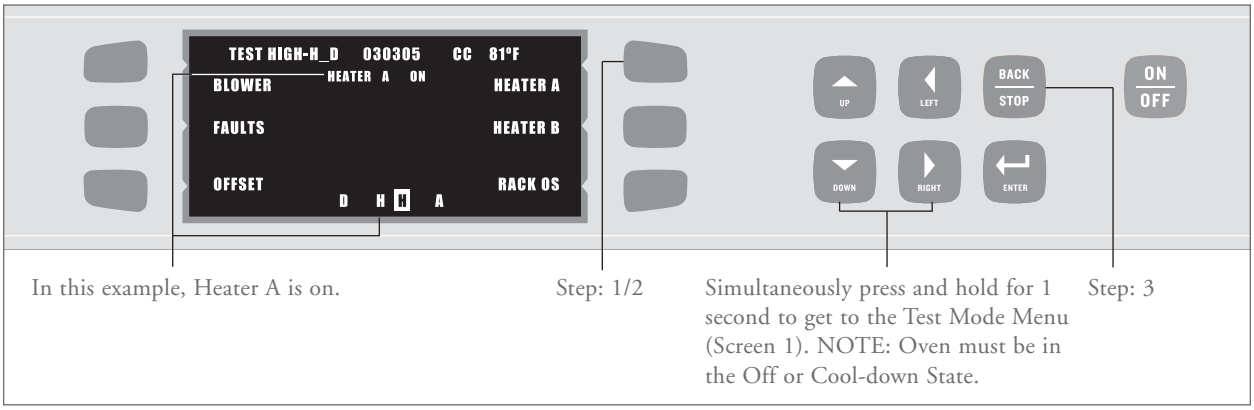


FIGURE 30: Checking Heater A

NOTE: Adjustments can be made only in Fahrenheit. (5°F equals approximately 2.8°C.)

NOTE: At 20°F, pressing the "OFFSET" Soft Key rolls the Temperature Offset back to 0°F.

3. Press "ENTER" to confirm.

4. When finished, press the "BACK/STOP" Key to exit the Test Mode Menu.

Checking Heaters A and B (Figures 30-31)

NOTE: If the Blower Speed is "0", the Blower will automatically set to idle airflow at the initiation of this test.

To turn on Heater A: (Figure 30)

1. From Screen 1 of the Test Mode Menu, press the "HEATER A" Soft Key (top right).

2. When finished testing, press the "HEATER A" Soft Key (top right) to turn Heater A off.

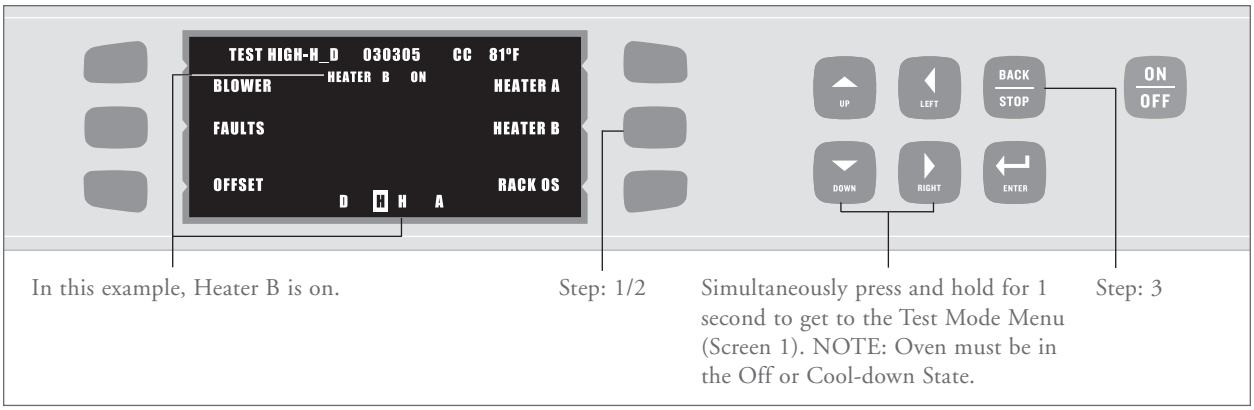
3. Press the "BACK/STOP" Key to end the test and exit the Test Mode Menu.

To turn on Heater B: (Figure 31, page 26)

1. From Screen 1 of the Test Mode Menu, press the "HEATER B" Soft Key (middle right).

2. When finished testing, press the "HEATER B" Soft Key (middle right) to turn Heater B off.

3. Press the "BACK/STOP" Key to end the test and exit the Test Mode Menu.



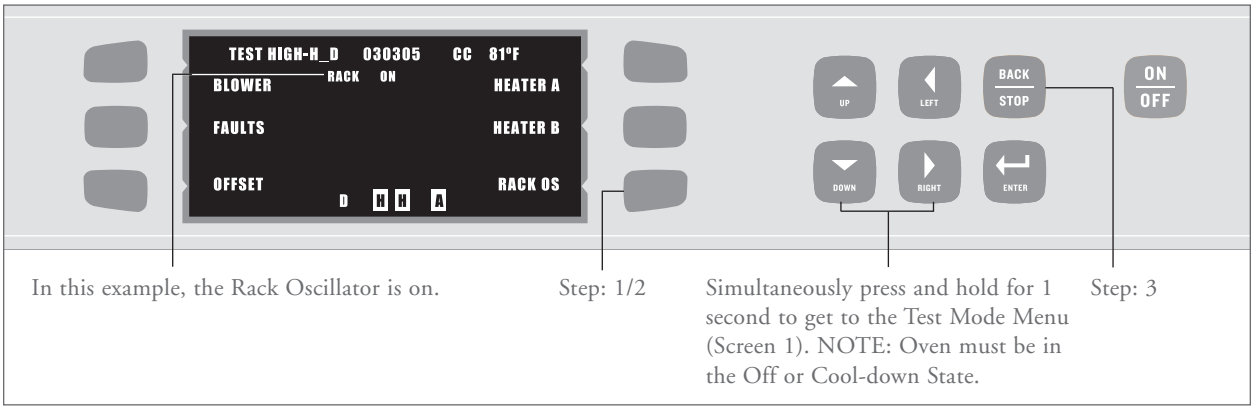
In this example, Heater B is on.

Step: 1/2

Simultaneously press and hold for 1 second to get to the Test Mode Menu (Screen 1). NOTE: Oven must be in the Off or Cool-down State.

Step: 3

FIGURE 31: Checking Heater B



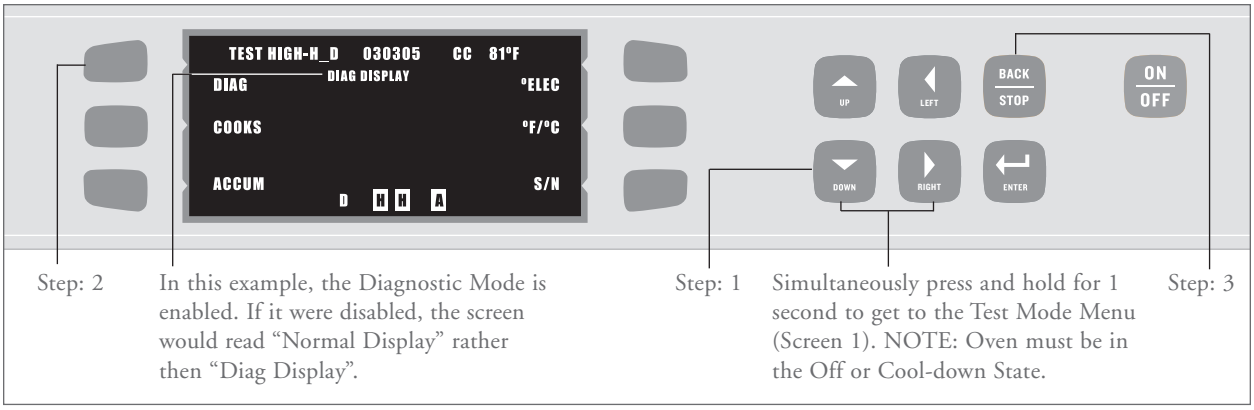
In this example, the Rack Oscillator is on.

Step: 1/2

Simultaneously press and hold for 1 second to get to the Test Mode Menu (Screen 1). NOTE: Oven must be in the Off or Cool-down State.

Step: 3

FIGURE 32: Testing the Rack Oscillator



Step: 2

In this example, the Diagnostic Mode is enabled. If it were disabled, the screen would read “Normal Display” rather then “Diag Display”.

Step: 1

Simultaneously press and hold for 1 second to get to the Test Mode Menu (Screen 1). NOTE: Oven must be in the Off or Cool-down State.

Step: 3

FIGURE 33: Enabling/Disabling the Diagnostic Mode

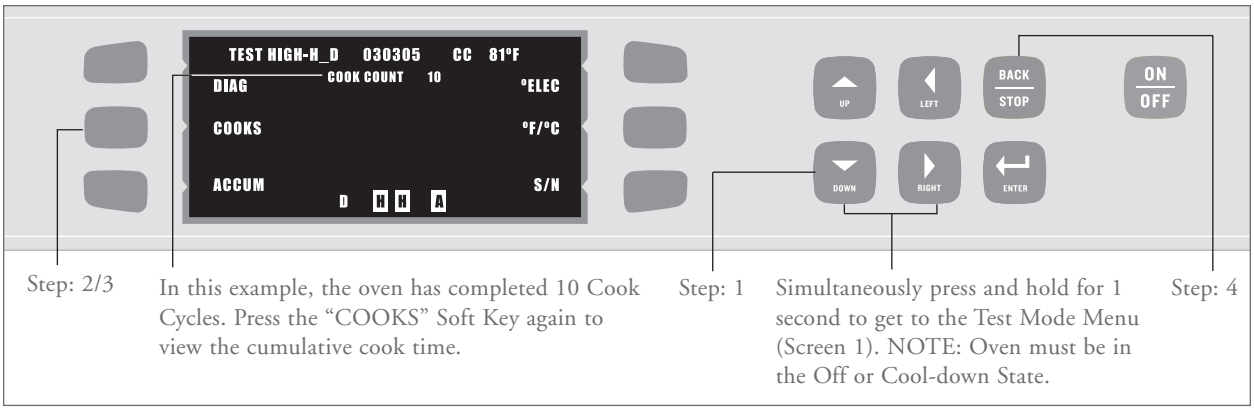


FIGURE 34: Viewing the Cook Counter/Cumulative Cook Time

Testing the Rack Oscillator (Figure 32)

NOTE: The Oven Rack will not oscillate if it is not properly set on the support pins.

To test the Rack Oscillator:

1. From Screen 1 of the Test Mode Menu, press the "RACK OSC" Soft Key (bottom right).

2. When finished testing, press the "RACK OSC" Soft Key (bottom right) again to turn the rack oscillator off.

3. Press the "BACK/STOP" Key to end the test and exit the Test Mode Menu.

Enabling/Disabling the Diagnostic Mode (Figure 33)

Enable Diagnostic Mode to

- View Cook Cycle parameters when cooking.
- View Status Indicators (page 23) during a Cook Cycle.

To enable/disable the Diagnostic Mode:

1. From Screen 1 of the Test Mode Menu, press the "DOWN" Key to toggle to Screen 2 of the Test Mode Menu.

2. Press "DIAG" Soft Key (top left) to turn the Diagnostic Mode on or off.

3. When finished, press the "BACK/STOP" Key to exit the Test Mode Menu.

Viewing Cook Counter/Time (Figure 34)

The High h Batch oven logs how many Cook Cycles have completed, as well as the cumulative cook time.

To view how many Cook Cycles have completed and the cumulative cook time:

1. From Screen 1 of the Test Mode Menu, press the "DOWN" Key to toggle to Screen 2 of the Test Mode Menu.

2. Press the "COOKS" Soft Key (middle left) to view total number of Cook Cycles completed.

3. To view the cumulative cook time, press the "COOKS" Soft Key (middle left) again.

4. When finished, press the "BACK/STOP" Key to exit the Test Mode Menu.

NOTE: To permanently erase the Cook Cycle totals, press the "ENTER" Key when viewing the total number of completed Cook Cycles.

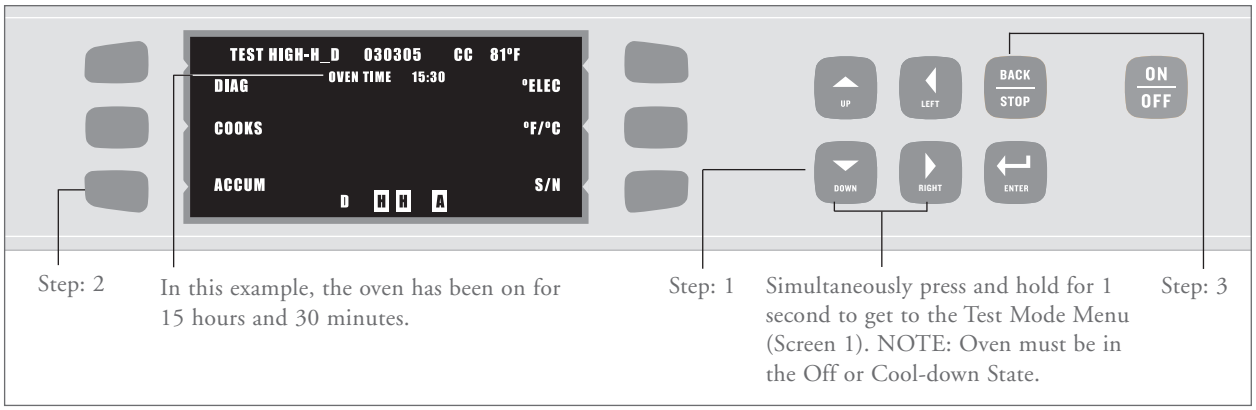


FIGURE 35: Viewing the Cumulative Operating Time

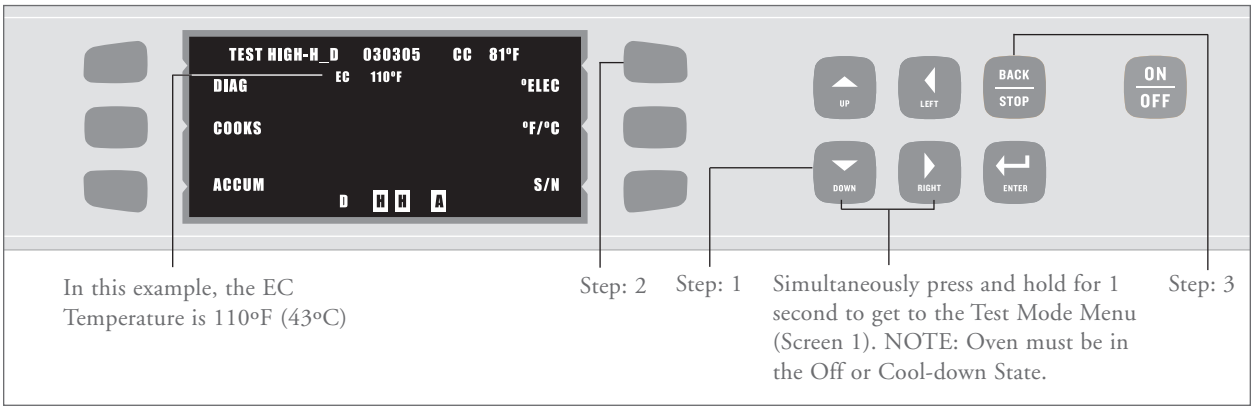


FIGURE 36: Viewing the Electrical Compartment (EC) Temperature

Viewing the Cumulative Operating Time (Figure 35)
The High h Batch oven logs the total amount of time the oven has been on.

To view this statistic:
1. From Screen 1 of the Test Mode Menu, press the "DOWN" Key to toggle to Screen 2 of the Test Mode Menu.

2. Press the "ACCUM" Soft Key (bottom left) to view cumulative operating time.

3. When finished, press the "BACK/STOP" Key to exit the Test Mode Menu.

NOTE: To permanently erase the Cumulative Operating time, press the "ENTER" Key when viewing the total.

Viewing the Electrical Compartment (EC) Temperature (Figure 36)
1. From Screen 1 of the Test Mode Menu, press the "DOWN" Key to toggle to Screen 2 of the Test Mode Menu.

2. Press the "°ELEC" Soft Key (top right) to view the EC Temperature.

3. When finished, press the "BACK/STOP" Key to exit the Test Mode Menu.

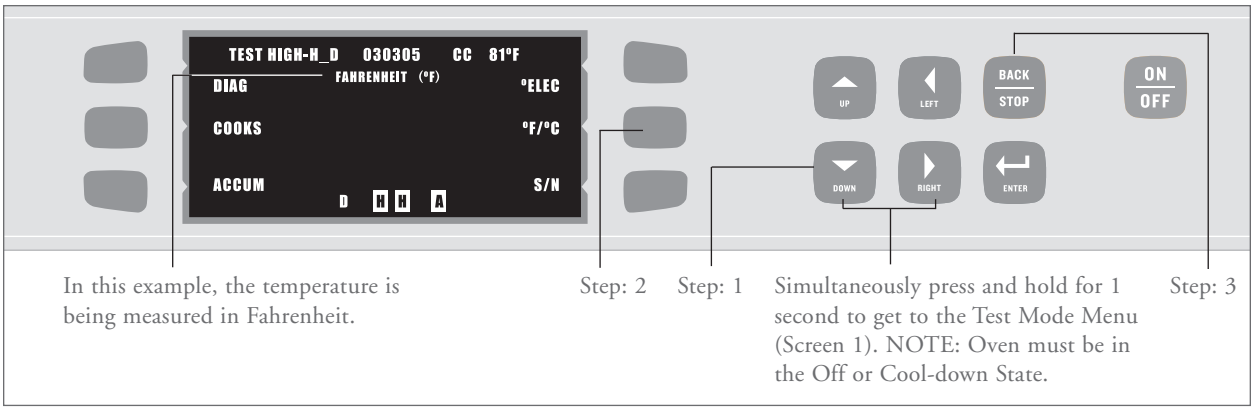


FIGURE 37: Changing the Fahrenheit/Celsius Option

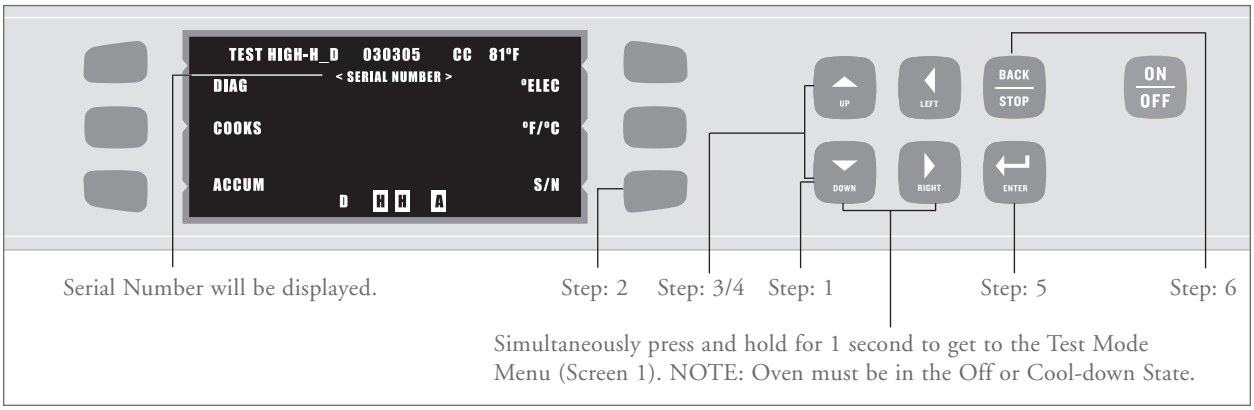


FIGURE 38: Viewing/Entering the Serial Number

Changing the Fahrenheit/Celsius Option (Figure 37)

1. From Screen 1 of the Test Mode Menu, press the "DOWN" Key to toggle to Screen 2 of the Test Mode Menu.

2. Press the "°F/°C" Soft Key (middle right) to change the type of temperature measurement.

3. When finished, press the "BACK/STOP" Key to exit the Test Mode Menu.

Viewing/Entering the Serial Number (Figure 38)

1. From Screen 1 of the Test Mode Menu, press the "DOWN" Key to toggle to Screen 2 of the Test Mode Menu.

2. Press the "S/N" Soft Key (bottom right) to view the Serial Number.

3. To change the Serial Number or enter it for the first time, press either the "UP" or "DOWN" Key. An editable Serial Number will display above the current one.

4. Edit each character using the "UP" and "DOWN" Key. The cursor will move to the next character if you wait 2 seconds.

5. Press the "ENTER" Key to confirm or the "BACK/STOP" Key to cancel.

6. When finished, press the "BACK/STOP" Key to exit the Test Mode Menu.

The Control System

The Control System signals, senses, commands, and actuates the oven's other components. For a schematic that includes all Control System components, see Figure 61, page 61. For more comprehensive hardware descriptions, see page 69.

This section contains:

- Serviceable Component Information and Replacement Instructions
- Parts and Part Numbers
- Troubleshooting

SERVICEABLE COMPONENTS

The following components of the Control System may at some point need to be replaced:

- Blower Motor Controller
- Cooling Fans – Inlet and Exhaust
- Display
- Display Keypad
- Door Switch
- Fuses
- I/O Control Board
- Power Supply
- Rack Oscillator Motor
- Relay
- Smart Card Reader
- Solid State Relay
- Thermocouple – CC
- Thermocouple – EC
- Thermostat – Cooling Fan
- Thermostat – Hi-Limit
- Voltage Sensor

Blower Motor Controller (Figure 39)
The proprietary Brushless DC Blower Motor Controller actuates the Blower Motor.

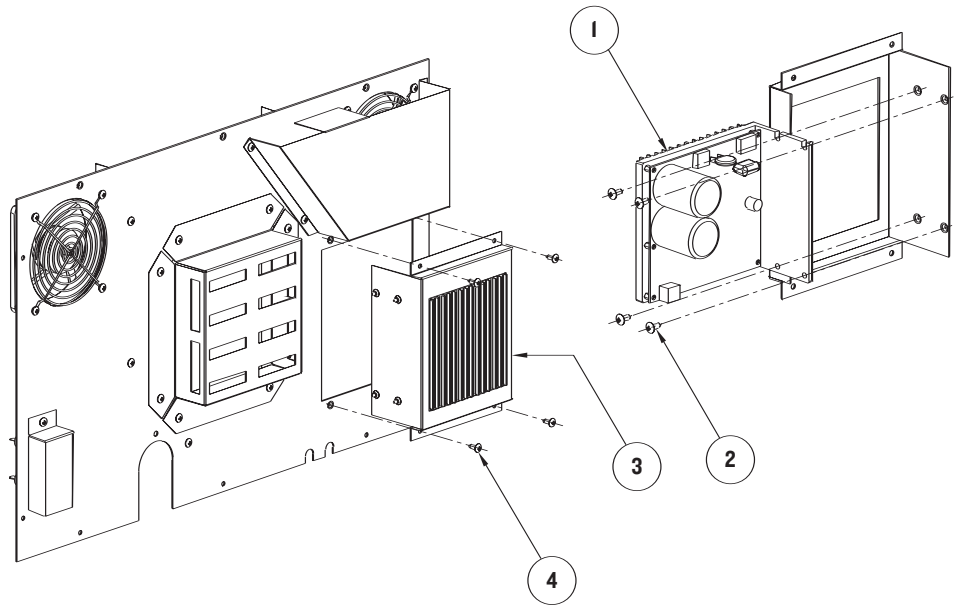
To replace a defective Blower Motor Controller:
1. Ensure "Cool Down" process is completed. ("Cool Down" message will disappear upon completion) and unplug the oven.

2. Remove Blower Motor Controller Bracket. The Motor Controller is attached to the bracket on the reverse side.

3. Disconnect Wiring Harness from the defective Blower Motor Controller.

4. Replace the defective Blower Motor Controller with P/N 100443.

5. Reconnect Wiring Harness and reattach the Blower Motor Controller cover.



NUMBER	PART	PART NUMBER
1	Blower Motor Controller	100443
2	Screw – Blower Motor Controller (x4)	101688
3	Bracket – Blower Motor Controller	HHB-8111
4	Screw – Blower Motor Controller Bracket (x4)	101688

FIGURE 39: Removing Blower Motor Controller

Cooling Fans (Figure 40)

Located on the back of the oven, the Cooling Fans ventilate air into the Electrical Compartment (via the inlet fan), then back out (via the exhaust fan).

To replace a defective fan:

1. Ensure "Cool Down" process is completed ("Cool Down" message will disappear upon completion) and unplug the oven.

2. Remove side panel nearest to defective fan.

3. If removing exhaust fan, remove covering.

4. Remove finger guard.

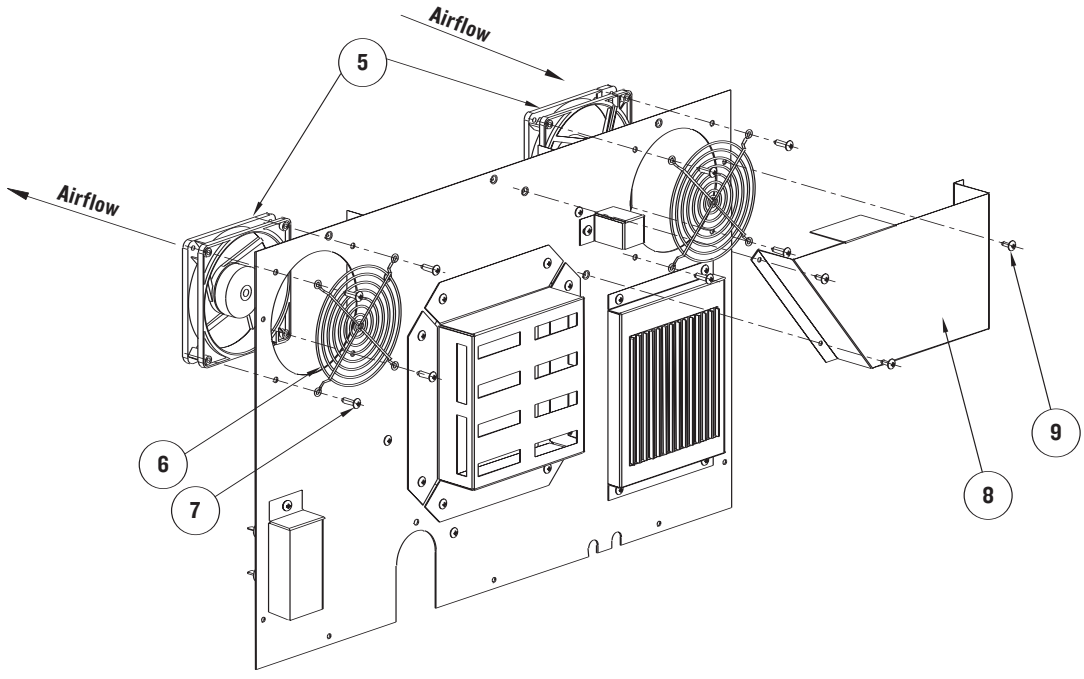
NOTE: The screws that hold finger guards in place also hold fans in place.

5. Disconnect Wiring Harness from fan.

6. Install new fan (P/N 100516) and reconnect Wiring Harness.

7. Reinstall finger guard(s)/covering.

8. Reattach side panel(s).



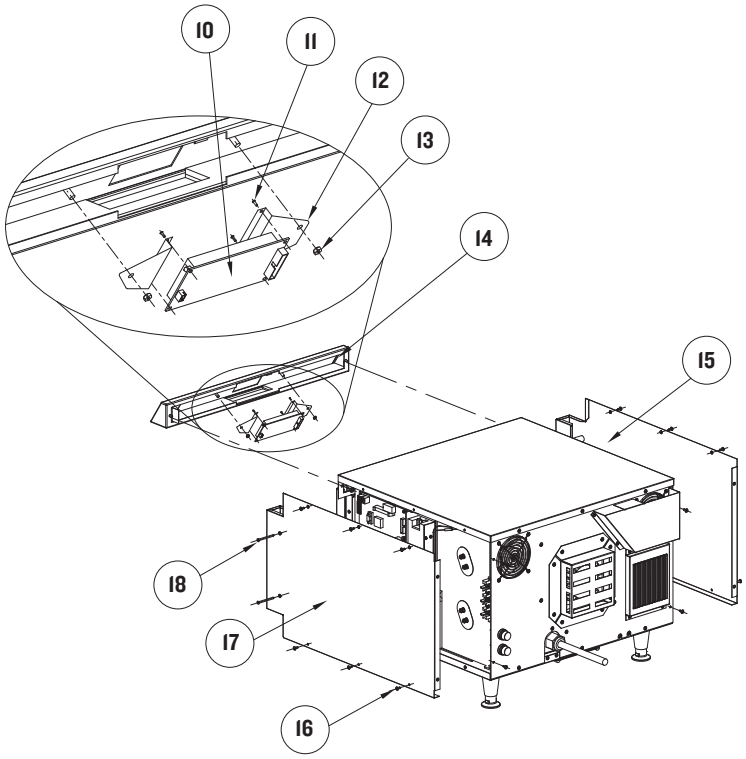
NUMBER	PART	PART NUMBER
5	Cooling Fans – Inlet/Exhaust	100516
6	Cooling Fan Finger Guard	100087
7	Screw – Cooling Fan Assy (4 x 2 fans = 8)	101694
8	Cover – Cooling Fan (Exhaust)	HHB-8079
9	Screw – Cooling Fan Cover (x3)	101688

FIGURE 40: Replacing Cooling Fans

Display (Figure 41)

To replace a defective Display:

1. Ensure "Cool Down" process is completed ("Cool Down" message will disappear upon completion) and unplug the oven.
2. Remove both side panels.
3. Remove Display Panel.
4. If ribbon cable is damaged, replace with P/N 103024 (not pictured) and jump to step 10.
5. If Display is defective, remove from Display Panel.
6. Remove Display Brackets from Display.
7. Replace Display with P/N 100505.



NUMBER	PART	PART NUMBER
10	Display	100505
11	Screw – Display (x4)	101520
12	Bracket – Display (x2)	HHB-8130
13	Nut – Display (x2)	102963
14	Panel – Display	HHB-8025
15	Panel – Left Side	HHB-8023-2
16	Screw – Side Panel (x8 per side)	101688
17	Panel – Right Side	HHB-8024-2
18	Screw – Front Side Panel (x2 per side)	101663

FIGURE 41: Replacing the Display

8. Attach Display Brackets to the new Display.

9. Attach new Display to Display Panel.

10. Reinstall Display Panel and reattach side panels.

Display Keypad (Figure 42)

The keypad is connected to I/O Control Board via 14 Pin Flat Cable.

To replace a defective keypad:

1. Ensure "Cool Down" process is completed ("Cool Down" message will disappear upon completion) and unplug the oven.

2. Remove Right Side Panel.

3. Disconnect keypad cable at I/O Control Board. (See page 61 for schematic.)

4. Gently peel keypad from Display Panel. If any adhesive residue remains on the Display Panel, clean with MEK.

5. Route the new keypad cable through correct openings (Figure 42).

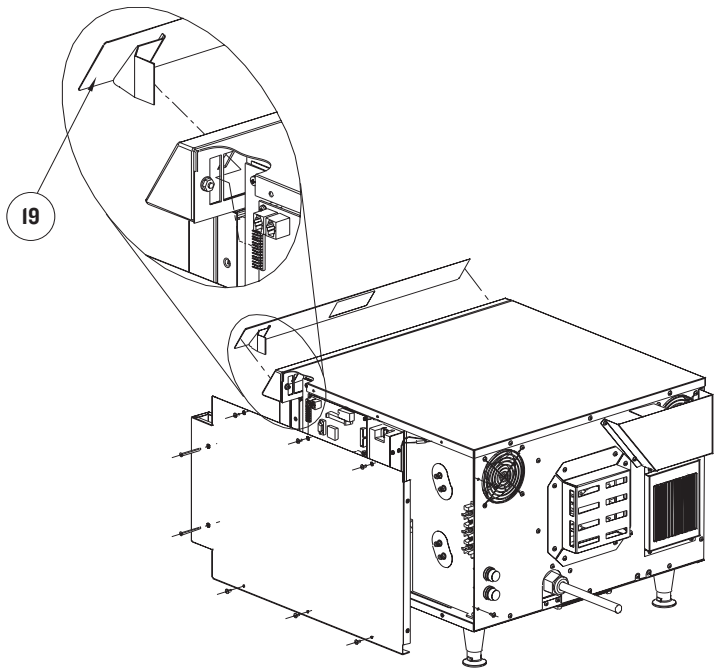
⚠ CAUTION: The keypad cable is delicate. If necessary, remove the Display Panel for easier access when routing the cable to avoid damaging it.

6. Peel paper strip from the back of the new keypad (P/N HHB-8064).

7. Starting from one corner, carefully place new keypad on the Display Panel.

8. Connect keypad cable to the I/O Control Board.

9. Reattach Right Side Panel.



NUMBER	PART	PART NUMBER
19	Display Keypad	HHB-8064

FIGURE 42: Replacing the Display Keypad

Door Switch (Figure 43)

The Door Switch is a sensor that detects the Door Actuator and determines whether the door is open or closed.

To replace a defective Door Switch:

1. Ensure "Cool Down" process is completed ("Cool Down" message will disappear upon completion) and unplug the oven.

2. Remove both side panels and Display Panel.

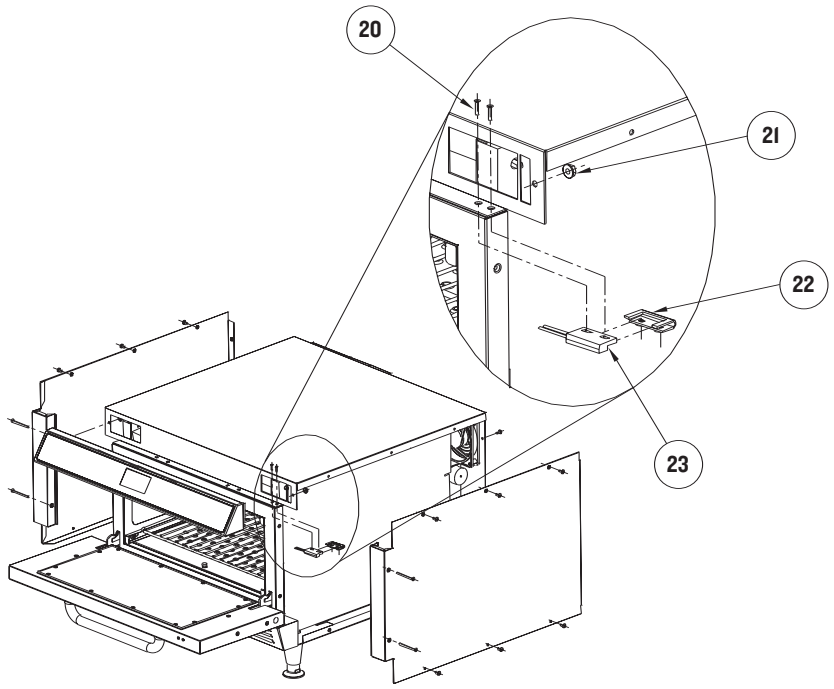
3. At the I/O Control Board, disconnect Wiring Harness that routes to Door Switch. (See page 61 for schematic.)

4. Replace defective switch with P/N 102788.

   NOTE: Retain mounting bracket for use with new switch.

5. Reconnect wiring to I/O Control Board.

6. Reattach Display Panel and side panels.



NOTE: Some oven components have been removed for clarity.

NUMBER	PART	PART NUMBER
20	Screw – Door Switch/Actuator (x2)	101421
21	Nut – Display Panel (x2)	100903
22	Door Switch/Actuator Mounting Bracket	HHB-8086
23	Door Switch	102788

FIGURE 43: Replacing the Door Switch

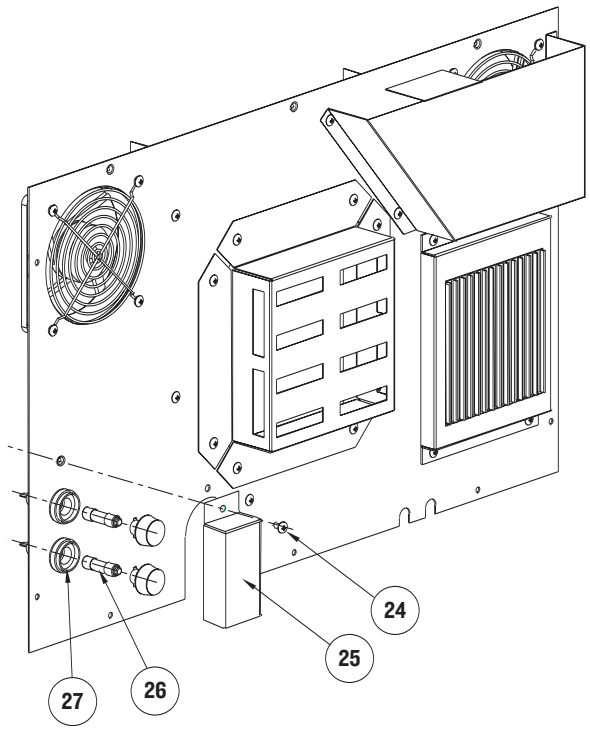
Fuses (Figure 44)

The Aux Fuses protect the Control System and Blower Motor.

⚠ CAUTION: Replace fuses with only class CC fuses of the same rating.

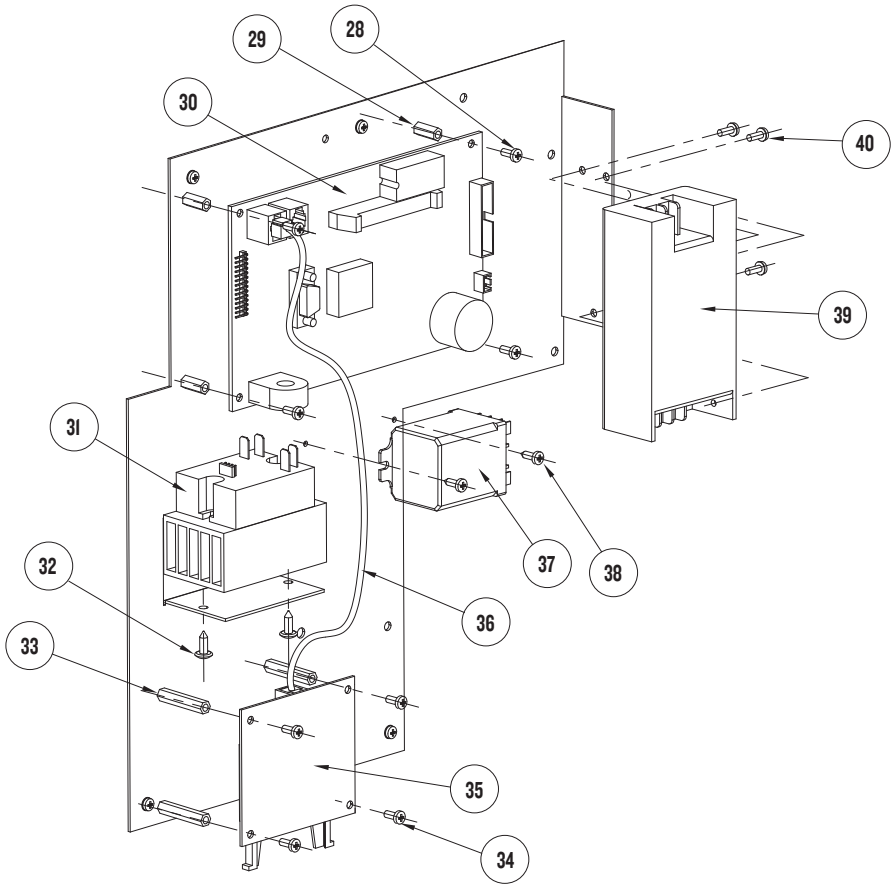
To replace a fuse:

1. Ensure "Cool Down" process is completed ("Cool Down" message will disappear upon completion) and unplug the oven.
2. Remove the Fuse Cover.
3. Rotate fuse cap 90° counterclockwise to access the fuse.
4. Disconnect Wiring Harness from fuse.
5. Replace the defective fuse with P/N 100592.
6. Reattach Wiring Harness.
7. Reinstall Fuse Holder and Fuse Cover.



NUMBER	PART	PART NUMBER
24	Screw – Fuse Cover	101688
25	Fuse Cover	HHB-8136
26	Fuse – Class CC, 12 Amp (x2)	100592
27	Fuse Holder (x2)	100586

FIGURE 44: Removing Fuses



NUMBER	PART	PART NUMBER
28	Screw – I/O Control Board (x4)	102910
29	Standoff – I/O Control Board (x4)	101951
30	I/O Control Board	NGC-1008
31	Solid State Relay	101286
32	Screw – Solid State Relay (x2)	101688
33	Standoff – Smart Card Reader (x4)	101947
34	Screw – Smart Card Reader (x4)	102911
35	Smart Card Reader	100506
36	Cable – Smart Card Reader	103023
37	Relay	101273
38	Screw – Relay (x2)	101687
39	Power Supply	101206
40	Screw – Power Supply (x3)	102911

FIGURE 45: Component Plate Assembly

Refer to the Component Plate Assembly (Figure 45) when replacing

- I/O Control Board
- Power Supply
- Relay
- Smart Card Reader
- Solid State Relay

I/O Control Board (Figure 45)

The I/O Control Board controls all aspects of oven operation.

To replace a defective I/O Control Board:

1. Ensure "Cool Down" process is completed ("Cool Down" message will disappear upon completion) and unplug the oven.

2. Record the Serial Number (see page 29 for viewing instructions).

3. Remove Right Side Panel.

4. Disconnect wiring from I/O Control Board.

5. Replace defective I/O Control Board with P/N NGC-1008.

6. Reconnect wiring and reattach Right Side Panel.

7. Re-enter the Serial Number (see page 29).

Power Supply (Figure 45)

24 VDC Output at 40 Watts. Supplies control voltage for I/O Control Board, Relay, and Solid State Relay (SSR).

To replace a defective Power Supply:

1. Ensure "Cool Down" process is completed ("Cool Down" message will disappear upon completion) and unplug the oven.

2. Remove Right Side Panel.

3. Disconnect Wiring Harness from the defective Power Supply.

4. Replace defective Power Supply with P/N 101206.

5. Reconnect Wiring Harness.

6. Reattach Right Side Panel.

Relay (Figure 45)

240 VAC, 30 Amp, Double Pole, Double Throw, 24 VDC Relay Coil. Actuates Rack Oscillator Motor.

To replace a defective relay:

1. Ensure "Cool Down" process is completed ("Cool Down" message will disappear upon completion) and unplug the oven.

2. Remove Right Side Panel.

3. Disconnect Wiring Harness from defective relay.

4. Replace defective relay with P/N 101273.

5. Reconnect Wiring Harness.

6. Reattach Right Side Panel.

Smart Card Reader (Figure 45)

Loads Recipe Menus from and writes Recipe Menus to the Smart Card.

To replace a defective Smart Card Reader:

1. Ensure "Cool Down" process is completed ("Cool Down" message will disappear upon completion) and unplug the oven.

2. Remove Right Side Panel.

3. Check if connection cable is damaged. If so, replace with P/N 103023 (not pictured) and jump to step 5.

4. If Smart Card Reader is defective, replace with P/N 100506.

5. Reattach Right Side Panel.

Solid State Relay (SSR) (Figure 45, Page 38)
The 240 VAC, Dual 40 Amp Solid State Relay actuates the Heater Element. When the SSR is actuated, the (-) control input will go to 0.00 VDC. When not actuated, the control input will read -24.00 VDC.

To replace a defective SSR:
1. Ensure "Cool Down" process is completed ("Cool Down" message will disappear upon completion) and unplug the oven.

2. Remove Right Side Panel.

3. Disconnect Wiring Harness from defective SSR.

4. Replace defective SSR with P/N 101286.

5. Reconnect Wiring Harness.

6. Reattach Right Side Panel.

Rack Oscillator Motor (Figure 46)
The Rack Oscillator Motor actuates the Swing Arm Assembly, which causes the rack to oscillate.

To replace a defective Rack Oscillator Motor:
1. Ensure "Cool Down" process is completed ("Cool Down" message will disappear upon completion) and unplug the oven.

2. Remove Blower Motor Controller Bracket (see page 32 for instructions). This will allow access to Rack Oscillator Motor.

3. Remove washer and retaining ring from crank. Retain them for use with new motor.

4. Remove the Rack Oscillator Motor from the Drag Link (not pictured).

5. Remove the Rack Oscillator Motor Bracket (with motor attached) from oven.

6. Remove Rack Oscillator Motor from Bracket.

7. Remove the crank from the motor shaft (attached via 3/16-inch screw, P/N 101714, not pictured.)

8. Disconnect the Wiring Harness from Rack Oscillator Motor.

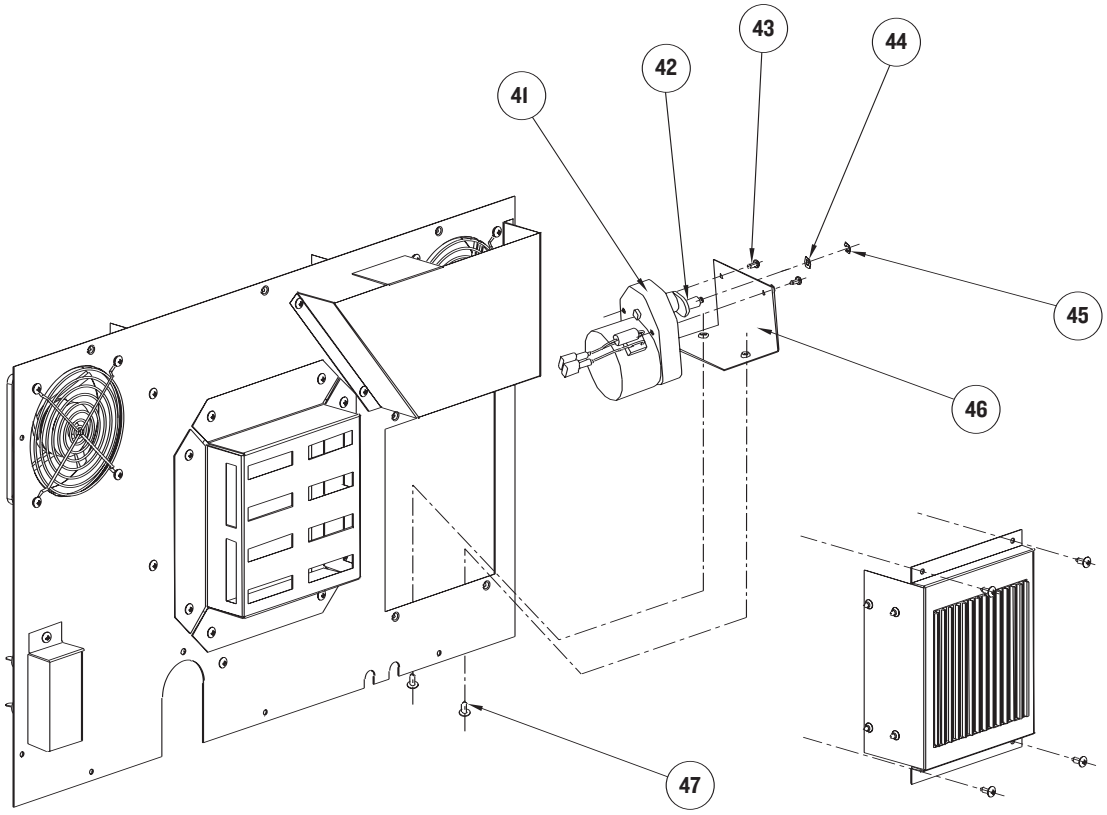
9. Install new motor (P/N HHB-8135) and reconnect Wiring Harness.

10. Reinstall crank and bracket.

11. Reattach Rack Oscillator Motor to drag link.

12. Fasten washer and retaining ring.

13. Reinstall Blower Motor Controller Bracket.



NUMBER	PART	PART NUMBER
41	Rack Oscillator Motor	HHB-8135
42	Crank – Rack Oscillator Motor	HHB-8045
43	Screw – Rack Oscillator Motor (x2)	101672
44	Washer – Rack Oscillator Motor	102451
45	Retaining Ring – Rack Oscillator Motor	101297
46	Bracket – Rack Oscillator Motor	HHB-8049
47	Screw – Rack Oscillator Motor Bracket (x2)	101688

FIGURE 46: Removing the Rack Oscillator Motor

Thermocouple – Cook Chamber (Figure 47)
Type K Thermocouple. Thermocouple measures the temperature of the recirculating impingement airflow. If the display indicates 999ºF/C, the Thermocouple is "open," resulting in an F7 Fault.

To replace a defective CC Thermocouple:
1. Ensure "Cool Down" process is completed ("Cool Down" message will disappear upon completion) and unplug the oven.

2. Remove Right Side Panel.

3. Pull back insulation where necessary.

4. Replace defective thermocouple with P/N NGC-1140.

5. Reset insulation and reattach Right Side Panel.

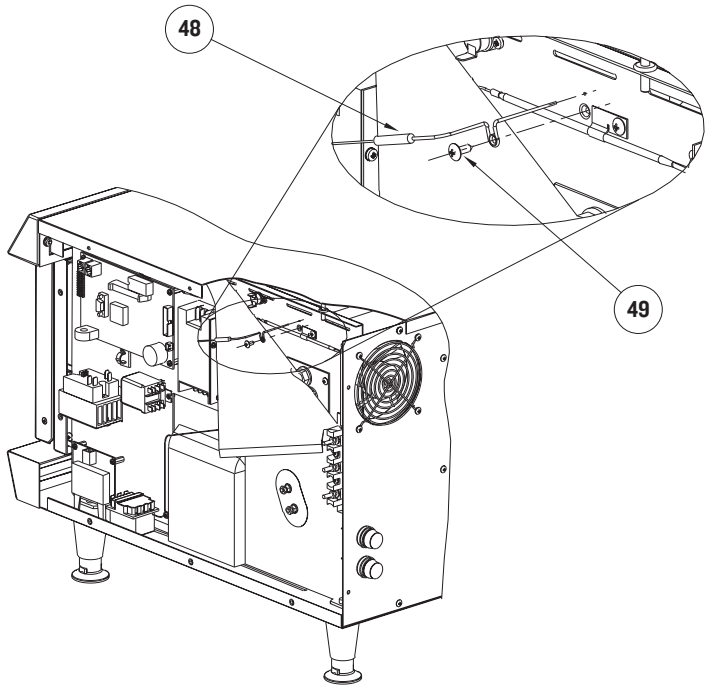
Thermocouple – Electrical Compartment (EC)
This Type K Thermocouple measures the temperature of the Electrical Compartment. If the temperature within the Electrical Compartment is above 158ºF (70°C), the control will display an F6 Fault.

To replace a defective EC Thermocouple:
1. Ensure "Cool Down" process is completed ("Cool Down" message will disappear upon completion) and unplug the oven.

2. Remove Right Side Panel.

3. Disconnect defective thermocouple from the I/O Control Board and install new one (P/N 700-1199). See page 61 for schematic.

4. Reattach Right Side Panel.



NUMBER	PART	PART NUMBER
48	Thermocouple – Cook Chamber	NGC-1140
49	Screw – Thermocouple – Cook Chamber	101688

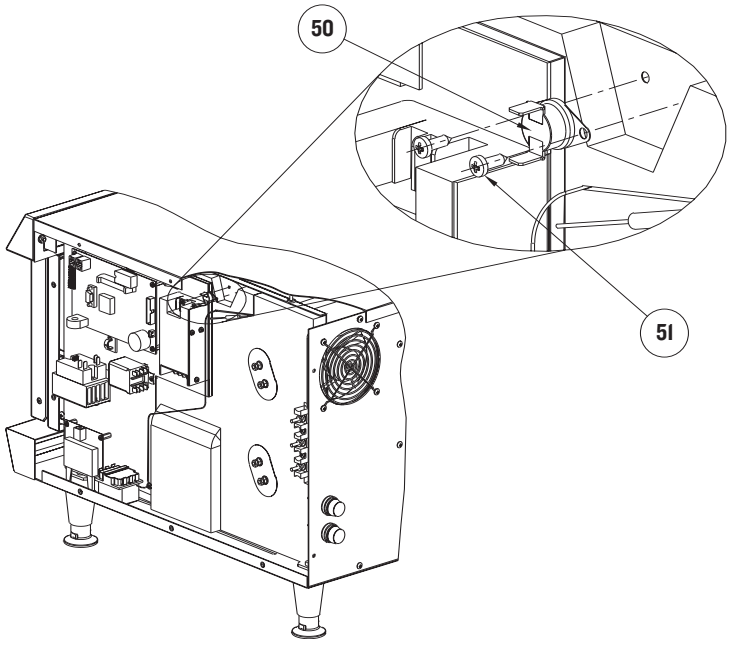
FIGURE 47: Removing the Cook Chamber (CC) Thermocouple

Thermostat – Cooling Fan (Figure 48)

The Cooling Fan Thermostat actuates the cooling fans when the Electrical Compartment Temperature reaches 120°F (49°C).

To replace a defective Cooling Fan Thermostat:

1. Ensure "Cool Down" process is completed ("Cool Down" message will disappear upon completion) and unplug the oven.
2. Remove Right Side Panel.
3. Pull back insulation where necessary.
4. Disconnect the Wiring Harness from the Cooling Fan Thermostat.
5. Replace defective thermostat with P/N 102086.
6. Reconnect Wiring Harness.
7. Reset insulation and reattach Right Side Panel.



NUMBER	PART	PART NUMBER
50	Thermostat – Cooling Fan	102086
51	Screw – Thermostat – Cooling Fan (x2)	101687

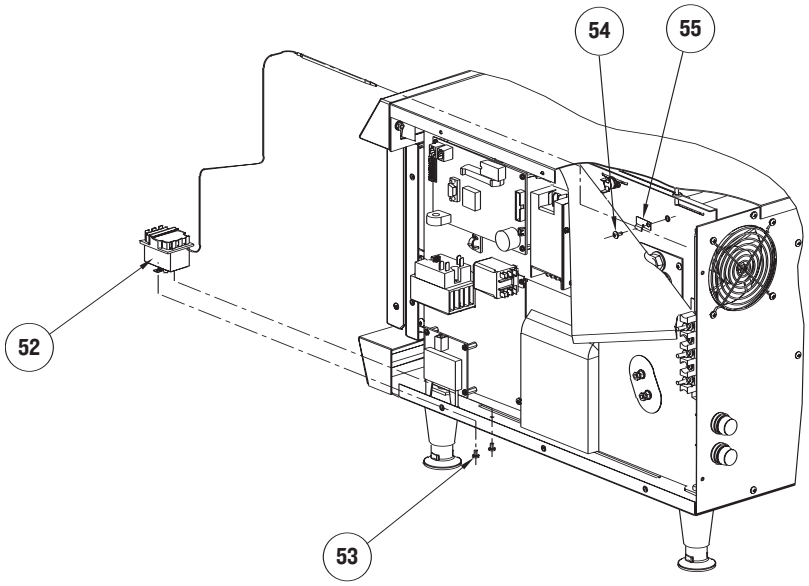
FIGURE 48: Removing Cooling Fan Thermostat

Thermostat – Hi-Limit (Figure 49)

The Hi-Limit Thermostat is a 250VAC, 3-Pole, manual-reset thermostat with a trip point of 572ºF (300°C). The Thermostat, which interrupts power to the Heater Element, should never operate during normal operation.

To replace a defective Hi-Limit Thermostat:

1. Ensure "Cool Down" process is completed ("Cool Down" message will disappear upon completion) and unplug the oven.
2. Remove Right Side Panel.
3. Pull back insulation where necessary.
4. Disconnect the Wiring Harness from the Hi-Limit Thermostat.
5. Replace defective thermostat with P/N 102075.
6. Reconnect Wiring Harness.
7. Reset insulation and reattach Right Side Panel.



NOTE: Some oven components have been removed for clarity.

NUMBER	PART	PART NUMBER
52	Thermostat – Hi-Limit	102075
53	Screw – Thermostat – Hi-Limit (x2)	101672
54	Screw – Thermostat Clamp	101688
55	Thermostat Clamp	NGC-1152

FIGURE 49: Removing the Hi-Limit Thermostat

Voltage Sensor (Figure 50)

Proprietary device designed to measure incoming line voltage and distribute either 208 or 240 VAC operation. The sensor is only included in ovens operated in North and South America.

To replace a defective Voltage Sensor:

1. Ensure "Cool Down" process is completed ("Cool Down" message will disappear upon completion) and unplug the oven.

2. Remove Right Side Panel.

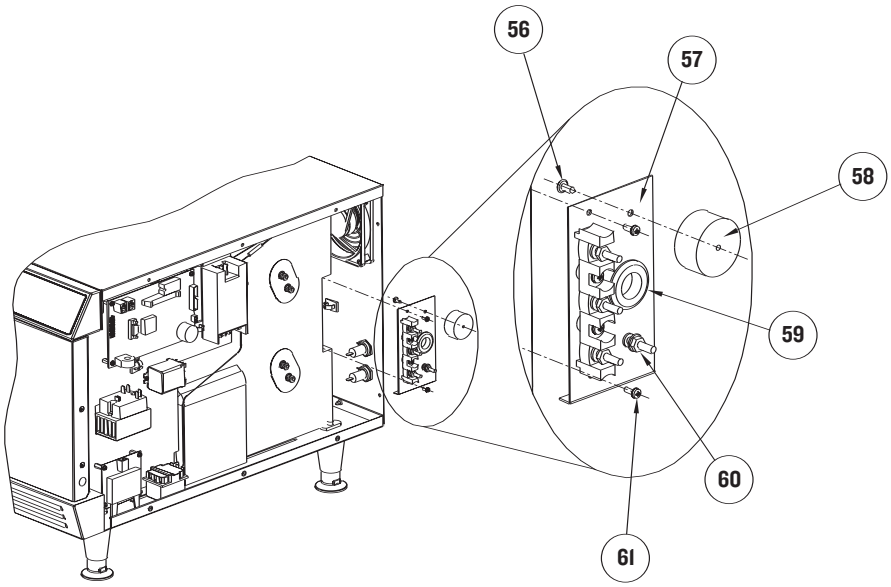
3. Remove Electrical Plate Assembly for access to Voltage Sensor Screw.

4. Disconnect wiring from Voltage Sensor (2 wires to Wiring Harness and 2 wires to terminal block).

5. Replace defective Voltage Sensor with P/N 100783.

6. Reconnect wiring.

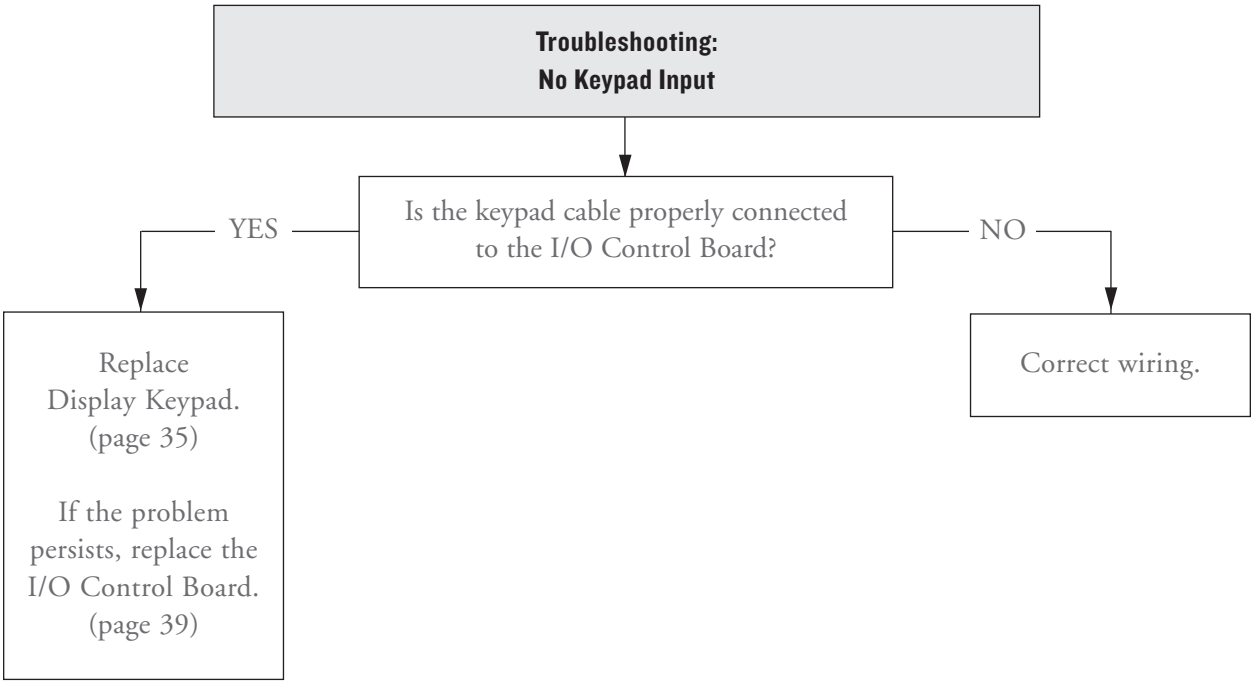
7. Reattach the Electrical Plate Assembly and side panel.

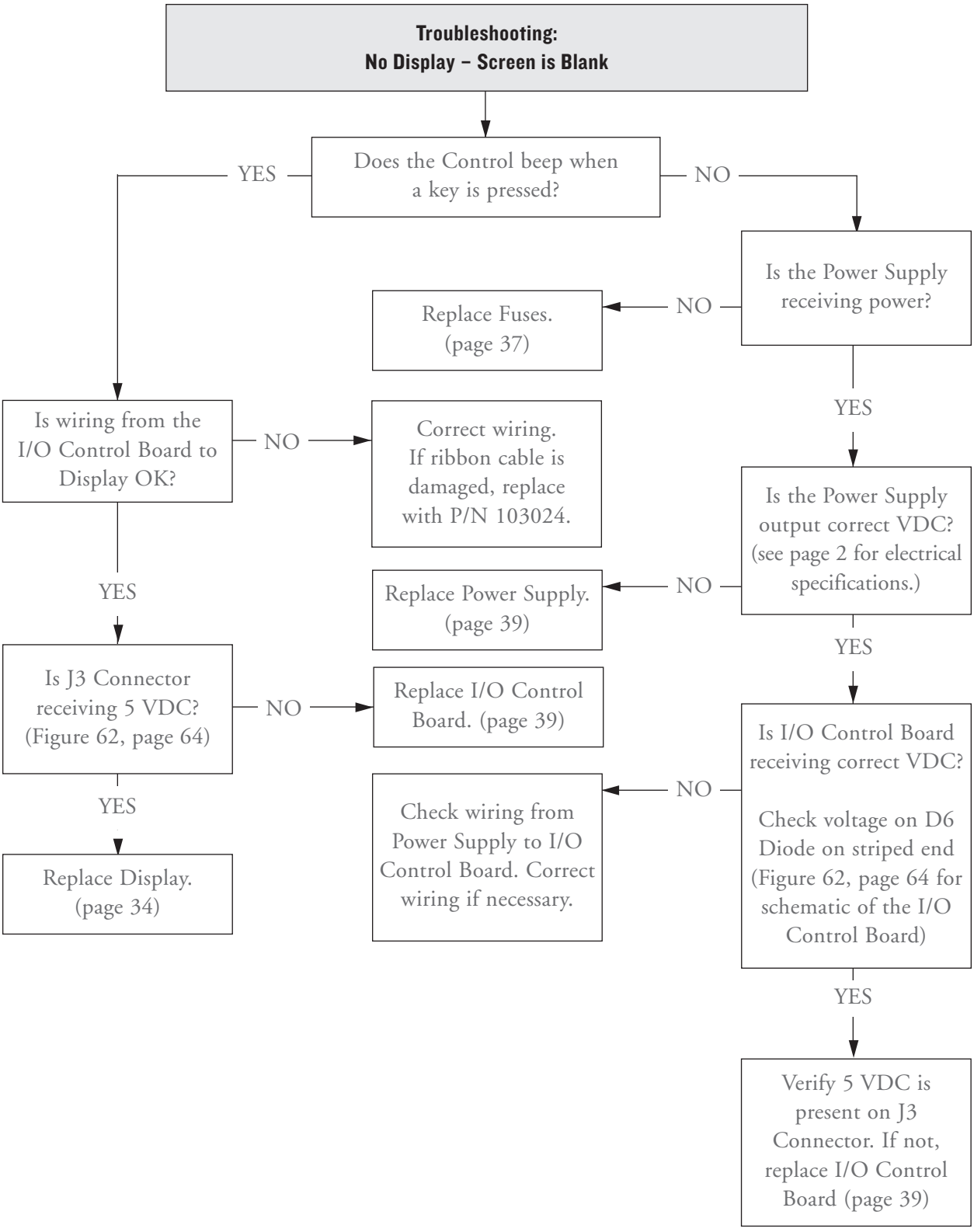


NUMBER	PART	PART NUMBER
56	Screw – Voltage Sensor	101688
57	Electrical Plate	HHB-8134
58	Voltage Sensor	100783
59	Grommet – Electrical Plate	100644
60	Nut – Electrical Plate Ground	100903
61	Screw – Electrical Plate (x2)	102911

FIGURE 50: Replacing Voltage Sensor

TROUBLESHOOTING




Troubleshooting:
No Display – Screen is Blank
Does the Control beep when a key is pressed?
YES
NO
Is the Power Supply receiving power?
NO
Replace Fuses. (page 37)
YES
Is the Power Supply output correct VDC? (see page 2 for electrical specifications.)
NO
Replace Power Supply. (page 39)
YES
Is I/O Control Board receiving correct VDC?
Check voltage on D6 Diode on striped end (Figure 62, page 64 for schematic of the I/O Control Board)
NO
Check wiring from Power Supply to I/O Control Board. Correct wiring if necessary.
YES
Verify 5 VDC is present on J3 Connector. If not, replace I/O Control Board (page 39)
Is wiring from the I/O Control Board to Display OK?
NO
Correct wiring. If ribbon cable is damaged, replace with P/N 103024.
YES
Is J3 Connector receiving 5 VDC? (Figure 62, page 64)
NO
Replace I/O Control Board. (page 39)
YES
Replace Display. (page 34)

The Oven Door

This section contains information on the Oven Door as it pertains to

- Serviceable Component Information and Replacement Instructions
- Parts and Part Numbers
- Troubleshooting

For more comprehensive hardware descriptions, see page 69.

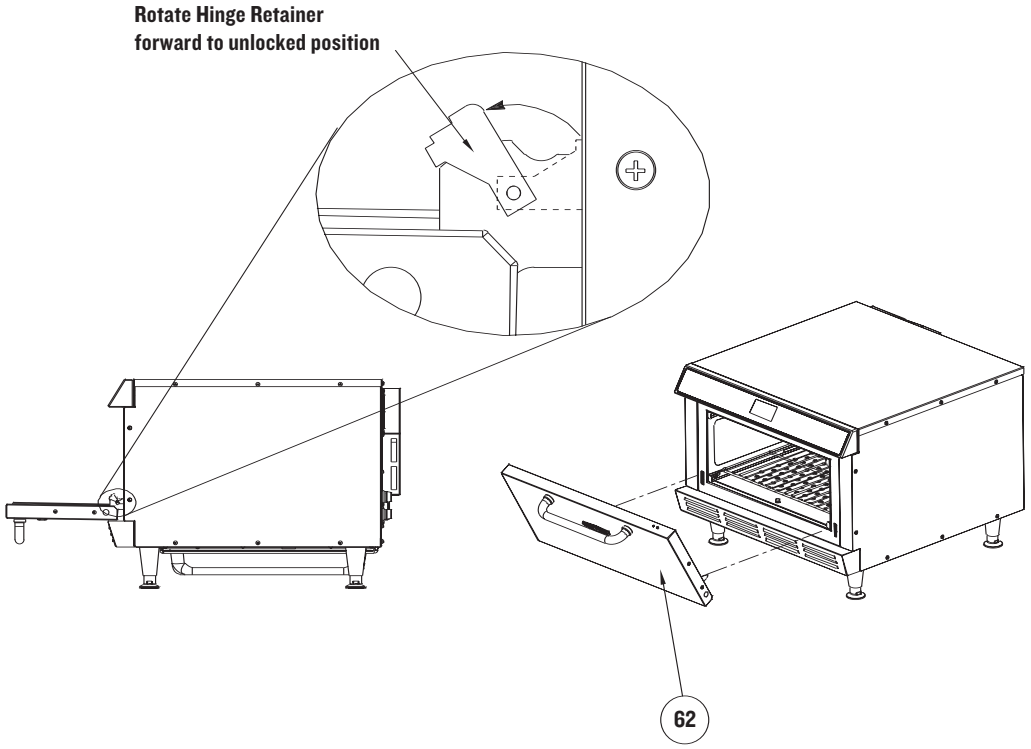
SERVICEABLE COMPONENTS

The following components of the oven door may at some point need to be replaced

- Door Gasket
- Door Hinge
- Door Switch

To access these components, first remove the Oven Door (Figure 51):

1. Ensure "Cool Down" process is completed. ("Cool Down" message will disappear upon completion.)
2. Open oven door.
3. Rotate hinge retainers to the unlocked state.
4. Raise oven door so it rests on hinge retainers.
5. Remove door.



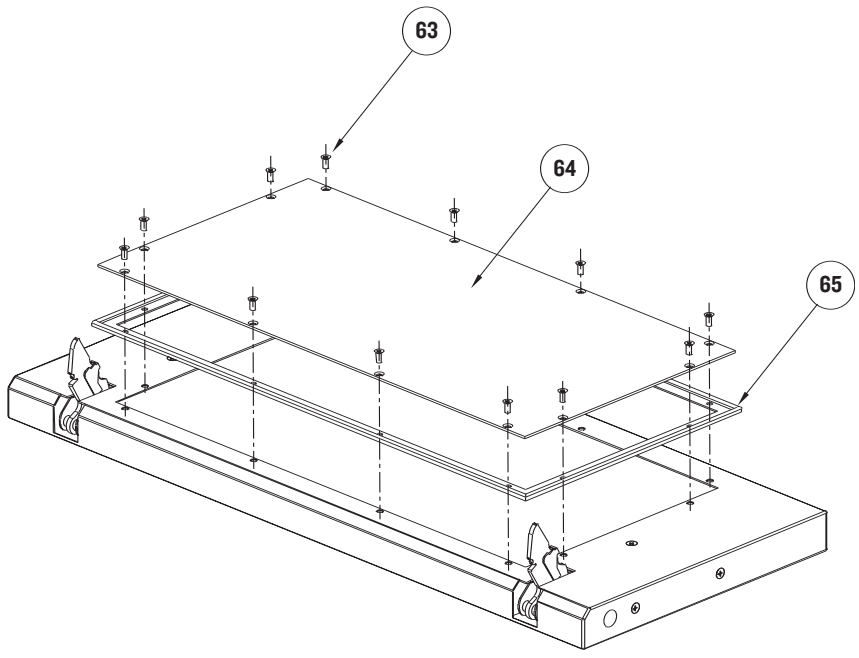
NUMBER	PART	PART NUMBER
62	Door	HHB-8080-2

FIGURE 51: Removing the Oven Door

Door Gasket (Figure 52)

To remove a damaged Door Gasket:

1. Ensure "Cool Down" process is completed. ("Cool Down" message will disappear upon completion.)
2. Remove door (page 49).
3. Remove inner plate.
4. Replace damaged gasket with P/N HHB-8101.
5. Reinstall inner plate.
6. Reattach oven door.
7. Return hinge retainers to locked state and close oven door.



NUMBER	PART	PART NUMBER
63	Screw – Door Inner Plate (x10)	102809
64	Door Inner Plate	HHB-8083
65	Door Gasket	HHB-8101

FIGURE 52: Removing the Door Gasket

Door Hinge (Figure 53)

Spring-loaded hinge can be removed and replaced as an entire unit.

To replace a Door Hinge:

1. Ensure "Cool Down" process is completed. ("Cool Down" message will disappear upon completion.)

2. Remove Oven Door (page 49).

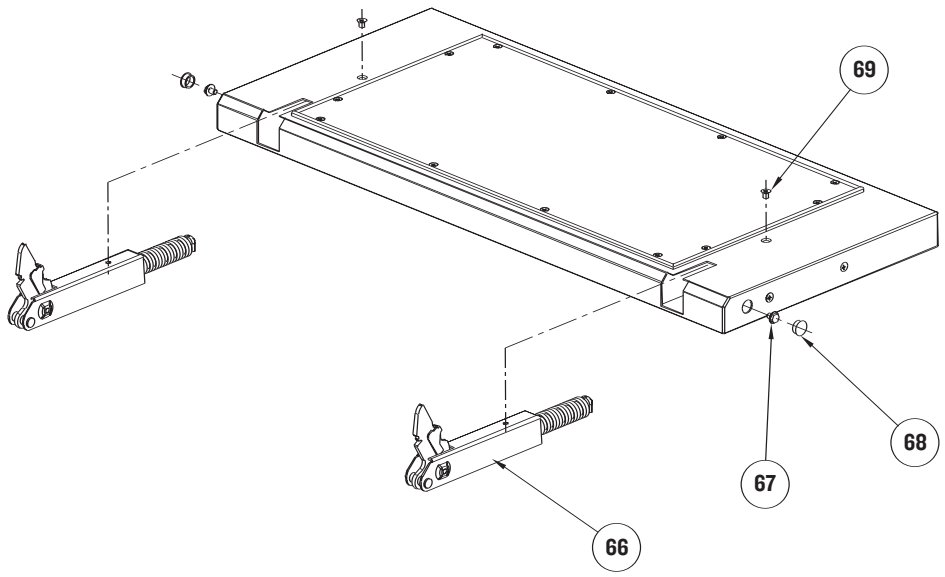
3. Replace hinge(s) with P/N 102807.

4. Reattach oven door.

5. Return hinge retainers to locked state and close oven door.

Door Switch

See Control System for description and replacement instructions (page 36).



NUMBER	PART	PART NUMBER
66	Door Hinge	102807
67	Push Nut (x2)	101293
68	Hole Plug (x2)	101191
69	Screw – Door Hinge (1 per hinge =2 total)	101402

FIGURE 53: Replacing a Hinge

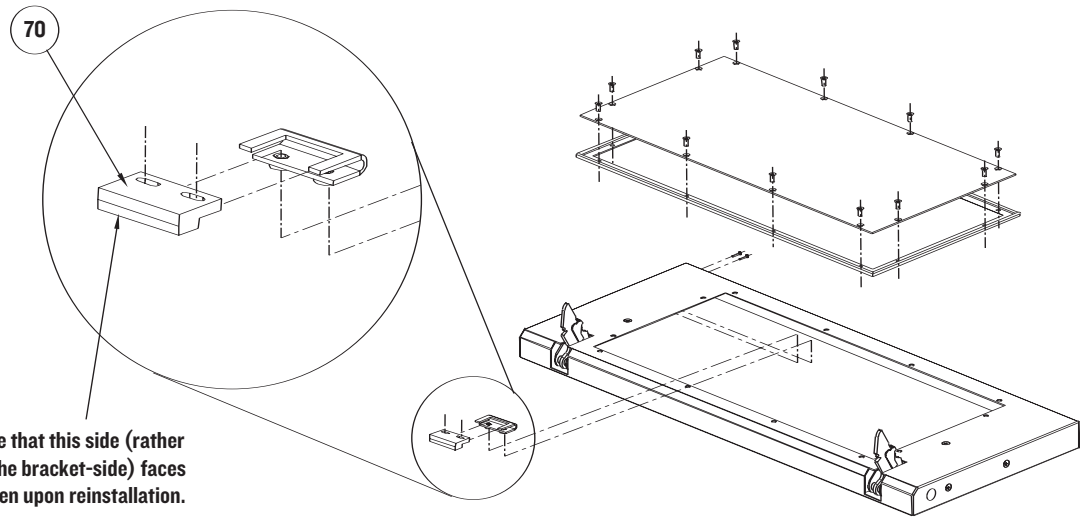
TROUBLESHOOTING

Troubleshooting:
"Cook Door Open" Message when Door is Closed

Is wiring from Door Switch to I/O Control Board OK?

- NO → Correct wiring. If wiring is damaged, replace the Door Switch (page 36).
- YES → Is the Door Switch properly installed? (Ensure it is not loose or cracked.)
  - YES → Replace Door Switch (page 36).

    If problem persists, ensure Door Actuator (see Figure 54, below) is properly installed. If problem continues to persist, replace I/O Control Board (page 39).
  - NO → Reset Door Switch.



NOTE: Some oven components have been removed for clarity.

NUMBER	PART	PART NUMBER
70	Door Actuator	102789

FIGURE 54: Door Actuator and Mounting Bracket

The Impingement Circuit

The Impingement Circuit provides the high temperature airflow necessary to brown and cook food items. For a schematic that includes all Impingement Circuit components, see Figure 61, page 61. For more comprehensive hardware descriptions, see page 69.

This section contains
- Serviceable Component Information and Replacement Instructions
- Parts and Part Numbers

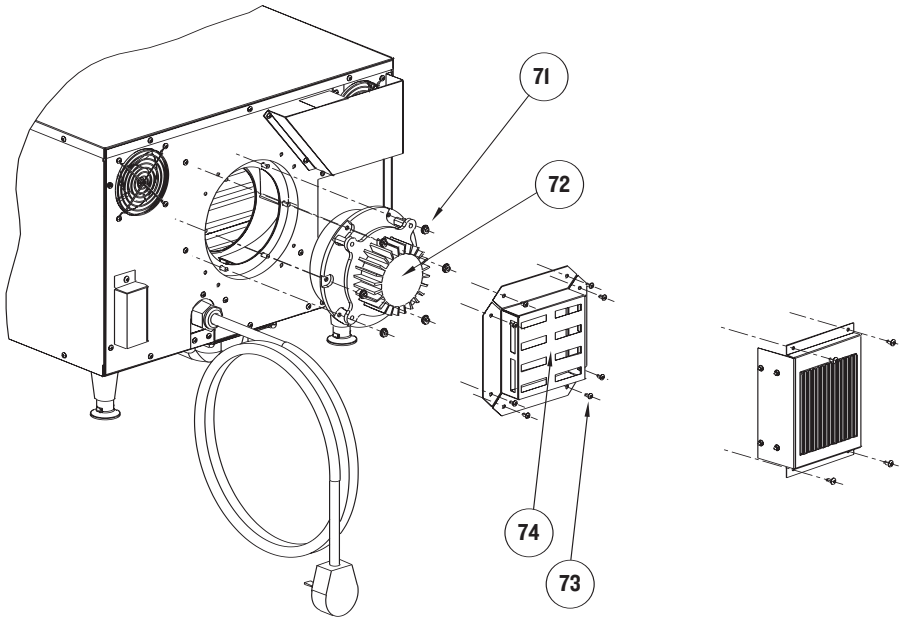
SERVICEABLE COMPONENTS

The following components of the Impingement Circuit may at some point need to be replaced.
- Blower Motor
- Heater Element
- Jetplates (Top and Bottom)
- Swing Arm Assembly

Blower Motor (Figure 55)

A Brushless DC Switch reluctance type. Its top speed is 7200 RPM at 3/4 HP.

To replace a defective Blower Motor:
1. Ensure "Cool Down" process is completed ("Cool Down" message will disappear upon completion) and unplug the oven.
2. Remove Blower Motor Controller (see page 32).
3. Disconnect wiring at Blower Motor Controller.
4. Remove Blower Motor Cover.
5. Replace defective motor with P/N HHB-8106.
6. Reconnect wiring and reinstall Blower Motor Controller/Blower Motor Cover.



NUMBER	PART	PART NUMBER
71	Nut – Blower Motor (x6)	100905
72	Blower Motor	HHB-8106
73	Screw – Blower Motor Cover (x8)	101688
74	Blower Motor Cover	NGC-1081

FIGURE 55: Removing the Blower Motor

Heater Element (Figure 56)

Sheathed-style/Calrod heaters. Attached to the same cartridge, Heaters A and B can be tested independently of one another.

To replace a defective heater:

1. Ensure "Cool Down" process is completed ("Cool Down" message will disappear upon completion) and unplug the oven.

2. Remove Right Side Panel.

3. Disconnect Wiring Harness from heaters.

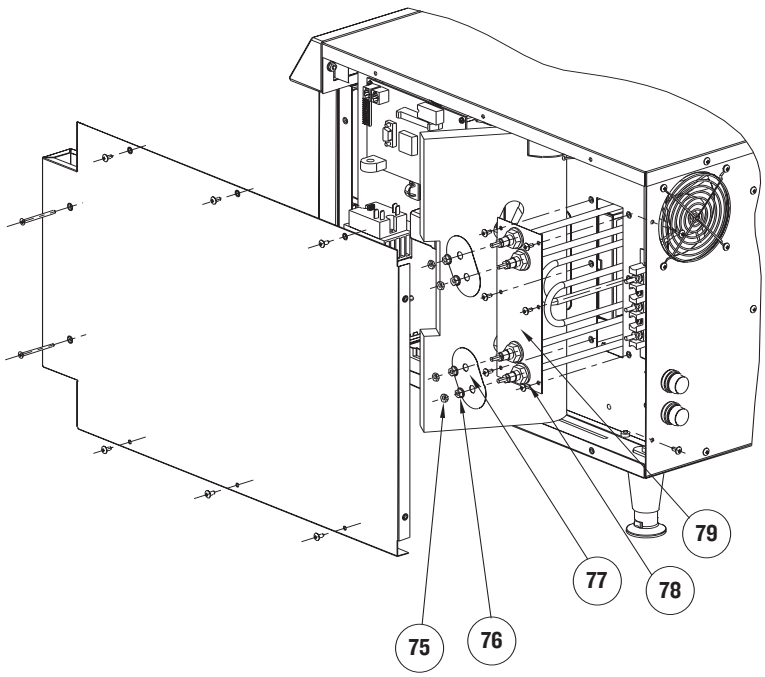
4. Remove Insulation Shield.

5. Pull back insulation where necessary.

6. Replace defective heater cartridge with P/N HHB-8099.
   a. Tighten flange nut
   b. Reconnect Wiring Harness
   c. Tighten jam nut

⚠ CAUTION: An over-tightened flange nut may cause heater failure. To prevent heater failure, hold a wrench to the flange nut to keep it in place when tightening the jam nut. This ensures the jam nut tightens to the flange nut, rather than the flange nut tightening more than it should.

7. Reset insulation.



NUMBER	PART	PART NUMBER
75	Nut (Jam) – Heater Element (x4)	102963
76	Nut (Flange) – Heater Element (x4)	100903
77	Heater Insulation Shield	HHB-8097
78	Screw – Heater Element (x6)	101688
79	Heater Element	HHB-8099

FIGURE 56: Removing the Heater Element

8. Reinstall Insulation Shield.

9. Reattach Right Side Panel.

Jetplates (Figure 57)
The Jetplates help maximize food quality. Different Jetplates facilitate different cooking results.

To replace a Jetplate:
1. Ensure "Cool Down" process is completed. ("Cool Down" message will disappear upon completion.)

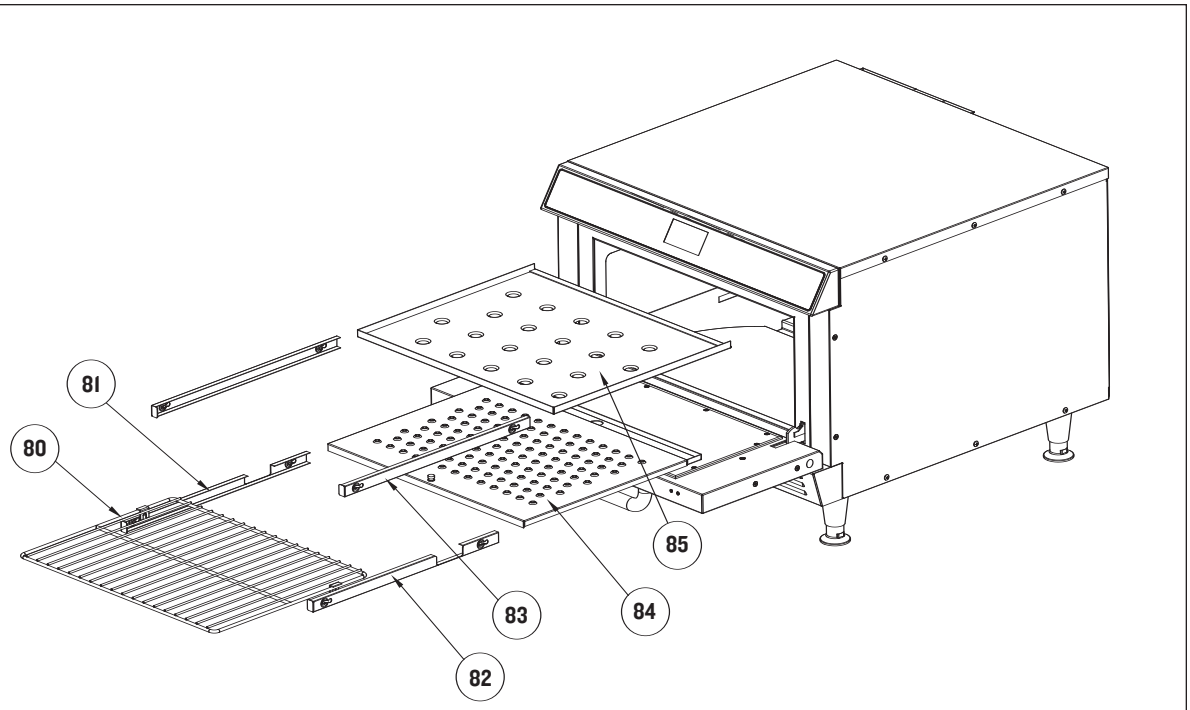
2. Remove Oven Rack.

3. Remove Support Rails.

   NOTE: Removing hardware is not required – the Support Rails snap on and off. However, they may require a gentle tap with a utensil to snap into and out of place.

4. Replace Jetplate(s). For a listing of the different types of Jetplates, see the comprehensive part listing, page 65.

5. Reinstall Support Rails and Oven Rack.



NUMBER	PART	PART NUMBER
80	Rack	HHB-8104
81	Support Rail – Bottom Left	HHB-8058-1
82	Support Rail – Bottom Right	HHB-8058-2
83	Support Rails – Top (x2)	HHB-8117
84	Jetplate – Standard – Bottom	HHB-8013-1
85	Jetplate – Standard – Top	HHB-8013-2

FIGURE 57: Removing Jetplates

Swing Arm Assembly (Figure 58)
The Swing Arm Assembly is actuated by the Rack Oscillator Motor. The attached oven rack oscillates when the Swing Arm Assembly is in motion.

If the rack is not oscillating properly,

1. Ensure "Cool Down" process is completed. ("Cool Down" message will disappear upon completion.)

2. Ensure recipe settings have the rack set at "ON." (See pages 12-14 for modifying recipes.)

3. If recipe settings are correct, ensure the Rack Oscillator Motor is working properly (page 41).

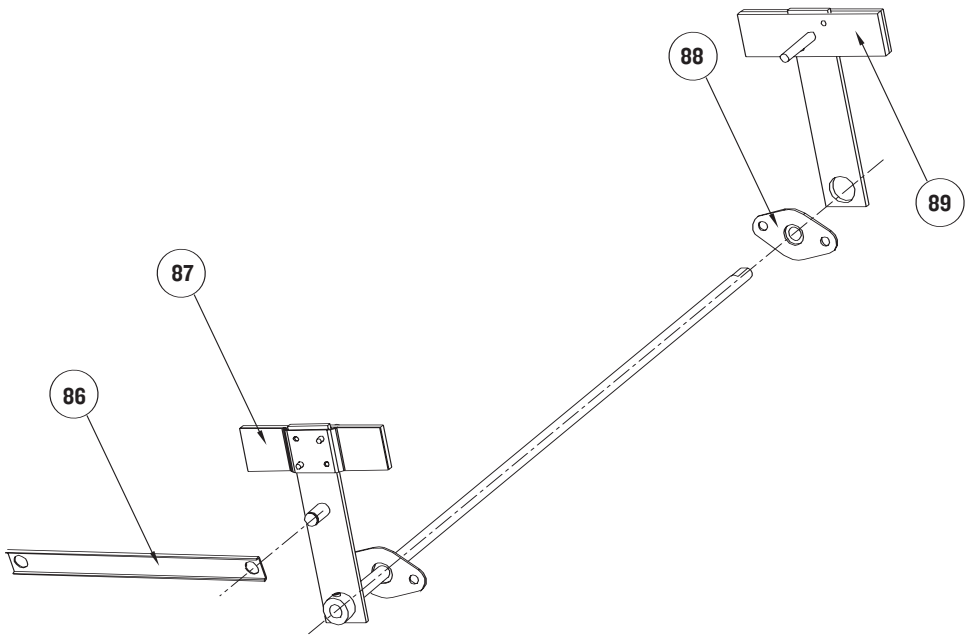
4. If problem persists, use the figure below to troubleshoot the Swing Arm Assembly.

5. Unplug the oven.

6. Remove all components from the left and right sides of the oven (including insulation) to access the Swing Arm Assemblies.

7. Remove the Swing Arm Covers.

8. Correct problem and reinstall all components.



NOTE: Some oven components have been removed for clarity.

NUMBER	PART	PART NUMBER
86	Drag Link – Swing Arm Assembly	HHB-8044
87	Swing Arm Assembly with Link Bar	HHB-8050
88	Bushing – Swing Arm Assembly (x2)	100152
89	Swing Arm Assembly	HHB-8040

FIGURE 58: Swing Arm Assembly

The Filtering System

The filtering system helps remove debris from the Cook Chamber. However, daily maintenance and deep cleaning are still required to ensure oven functions most efficiently. For more comprehensive hardware descriptions, see page 69.

This section contains
- Serviceable Component Information and Replacement Instructions
- Parts and Part Numbers

SERVICEABLE COMPONENTS

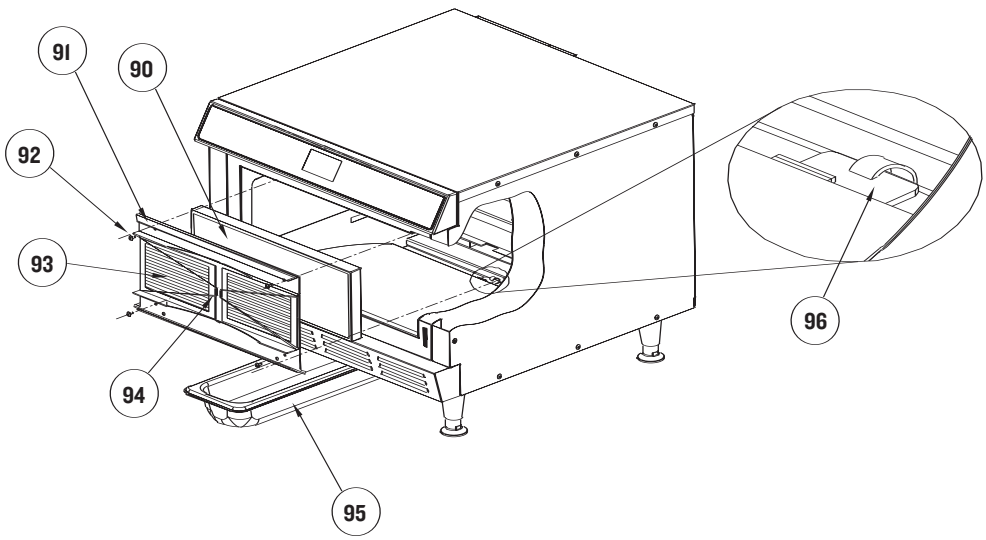
- Catalytic Converter
- Filters

Catalytic Converter (Figure 59)

The Catalytic Converter – a VOC-type catalyst – cleans the recirculating airflow. The catalyst substantially lowers the combustion temperature of grease entrained in the air path to approximately the same temperature of the airflow, thus breaking down grease into CO_2 and H_2O as it passes through the Catalytic Converter. The catalyst operates most efficiently at temperatures above 475ºF (246ºC).

To service the Catalytic Converter:
1. Ensure "Cool Down" process is completed. ("Cool Down" message will disappear upon completion.)

2. Remove Oven Rack.



NOTE: Some oven components have been removed for clarity.

NUMBER	PART	PART NUMBER
90	Catalytic Converter	HHB-8108
91	Air Diverter Plate	HHB-8030
92	Screw – Air Diverter Plate (x4)	101688
93	Filter (x2)	HHB-8114
94	Filter Clip (x2)	HHB-8115
95	Drain Pan	101091
96	Drain Lid	HHB-8141

FIGURE 59: Filtering System Parts

3. Remove Jetplates (page 55).

4. Remove Air Diverter Plate.

5. Remove the Catalytic Converter.

6. Clean the Catalytic Converter with TurboChef Oven Cleaner (P/N 103180).

⚠ CAUTION: DO NOT use a substitute cleaner.

7. Rinse thoroughly with distilled water.

⚠ CAUTION: Use distilled water only.

8. Let the Catalytic Converter air dry before reinstalling.

9. If necessary, replace the Catalytic Converter with P/N HHB-8108.

Filters (Figure 59)

The two Filters help prolong the life of the Catalytic Converter by trapping excess grease. They are attached to the Air Diverter Plate via the Filter Clips. When deep cleaning the oven (see page 59), the operator/technician should check to see if the Filters need to be replaced.

To remove a Filter:

1. Ensure "Cool Down" process is completed. ("Cool Down" message will disappear upon completion.)

2. Remove Oven Rack.

3. Remove Jetplates (page 55).

4. If more room to operate is necessary, remove the Air Diverter Plate.

5. Unfasten the Filter Clip from the center of the Air Diverter Plate.

6. Swing the clip open and remove the Filter.

7. If necessary, replace it with P/N HHB-8114.

8. Reconnect the clip and reinstall all components.

Cleaning the Oven

DAILY MAINTENANCE

The procedures below will help in maintaining the High h Batch oven. Be sure to use only TurboChef Oven Cleaner. Using any other cleaning products can damage critical parts and may void warranty on those parts. Refer to Figure 60, page 60 to view the Cook Chamber components.

Supplies and Equipment

- TurboChef Oven Cleaner
- Nylon scrub pad
- Cleaning towel

Cleaning Procedures

Step I: Prepare the Oven for Cleaning.

- Ensure oven is turned off. To turn off oven, press "ON/OFF" Key.
- Ensure Cool Down process is complete. ("Cooling Down" will disappear upon completion.)

⚠ WARNING: Possible injury can occur if oven is not allowed to cool properly before cleaning. do not attempt to clean it until the "Cooling Down" message is off.

Step 2: Remove Oven Rack.

- Wash, rinse, and sanitize Oven Rack.

Step 3: Clean Oven Door and Cook Chamber.

- Using a damp towel, remove food particles.
- In case of stubborn stain, spray TurboChef Oven Cleaner.

⚠ CAUTION: Do not spray or wipe cleaning chemicals onto the Catalytic Converter (See Figure 60 for a diagram of the Cook Chamber).

- Allow cleaner to penetrate for 5 minutes.
- Scrub with nylon scrub pad, if necessary.
- Wipe Oven Door and Cook Chamber with damp towel.

Step 4: Reattach the Oven Rack.

Step 5: Wipe Oven Exterior with a Clean, Damp Towel.

DEEP CLEAN INSTRUCTIONS

TurboChef recommends deep cleaning the oven once a month (or more frequently, depending on use) to ensure optimal performance. Be sure to use only TurboChef Oven Cleaner. Using any other cleaning products can damage critical parts and may void warranty. Reference Figure 60, page 60, to view Cook Chamber components.

Supplies and Equipment

- TurboChef Oven Cleaner
- Nylon scrub pad
- Cleaning towel

Deep Clean Procedures

Step I: Prepare the Oven for Cleaning.

- Ensure oven is turned off. To turn off oven, press "ON/OFF" Key.
- Ensure Cool Down process is complete. ("Cooling Down" will disappear upon completion.)

⚠ WARNING: Possible injury can occur if oven is not allowed to cool properly before cleaning. do not attempt to clean it until the "Cooling Down" message is off.

Step 2: Clean and Remove the Oven Door.

- Spray TurboChef Oven Cleaner to break up stubborn stains. Allow cleaner to penetrate for 5 minutes.
- Scrub with nylon scrub pad, if necessary.
- Wipe down.
- See page 49 for removal instructions.

Step 3: Remove Oven Rack.

- Wash, rinse, and sanitize Oven Rack.

Step 4: Remove Top and Bottom Jetplates.

- For instructions, see page 55.
- Wash, rinse and sanitize the Jetplates and Support Rails.

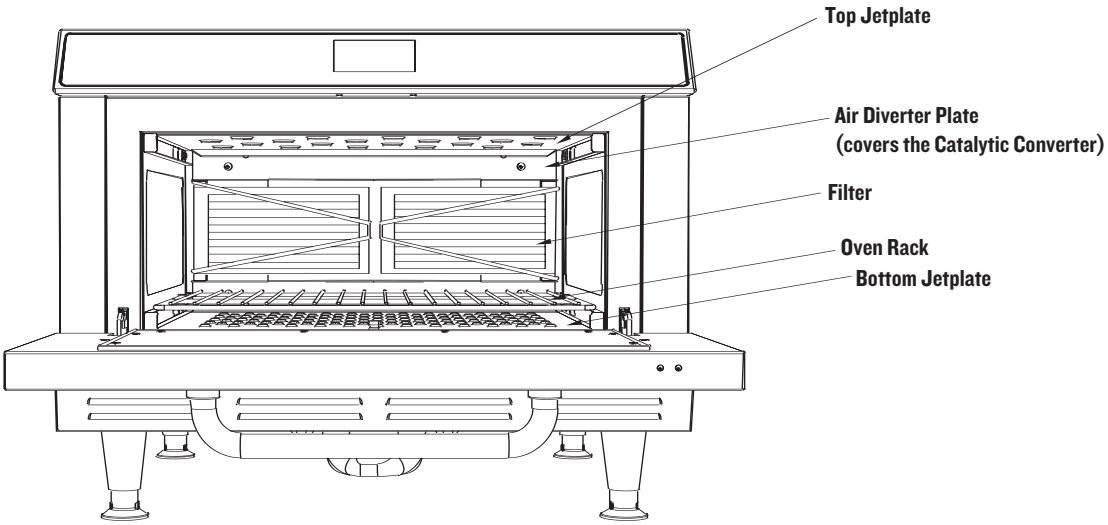


FIGURE 60: The Cook Chamber

Step 5: Check Grease Filters.

- Plate is attached via 4 screws.
- Check to see if Filters (P/N HHB-8114) need to be replaced. To order Filters, call 800.90TURBO or your Authorized Distributor.
- If necessary, remove Filters by first unhooking the Filter Clip (P/N HHB-8115) which is attached at the center of the Air Diverter Plate.

Step 6: Clean the Cook Chamber and Drain System.

- Spray TurboChef Oven Cleaner to break up stubborn stains. Allow cleaner to penetrate for 5 minutes.
- Scrub with nylon scrub pad, if necessary.
- Open the Drain Lid and use water to flush out food particles into the Drain Pan.

Step 7: Dry Cook Chamber and Drain System.

- Using a clean dry towel, dry the Cook Chamber and Drain System.

Step 8: Remove the Drain Pan.

- Wash, rinse and sanitize the Drain Pan.

Step 9: Reattach and Reinstall all Clean Components.

Step 10: Wipe Down the Outside of the Oven with a Clean, Damp Towel.

High h Batch Schematic

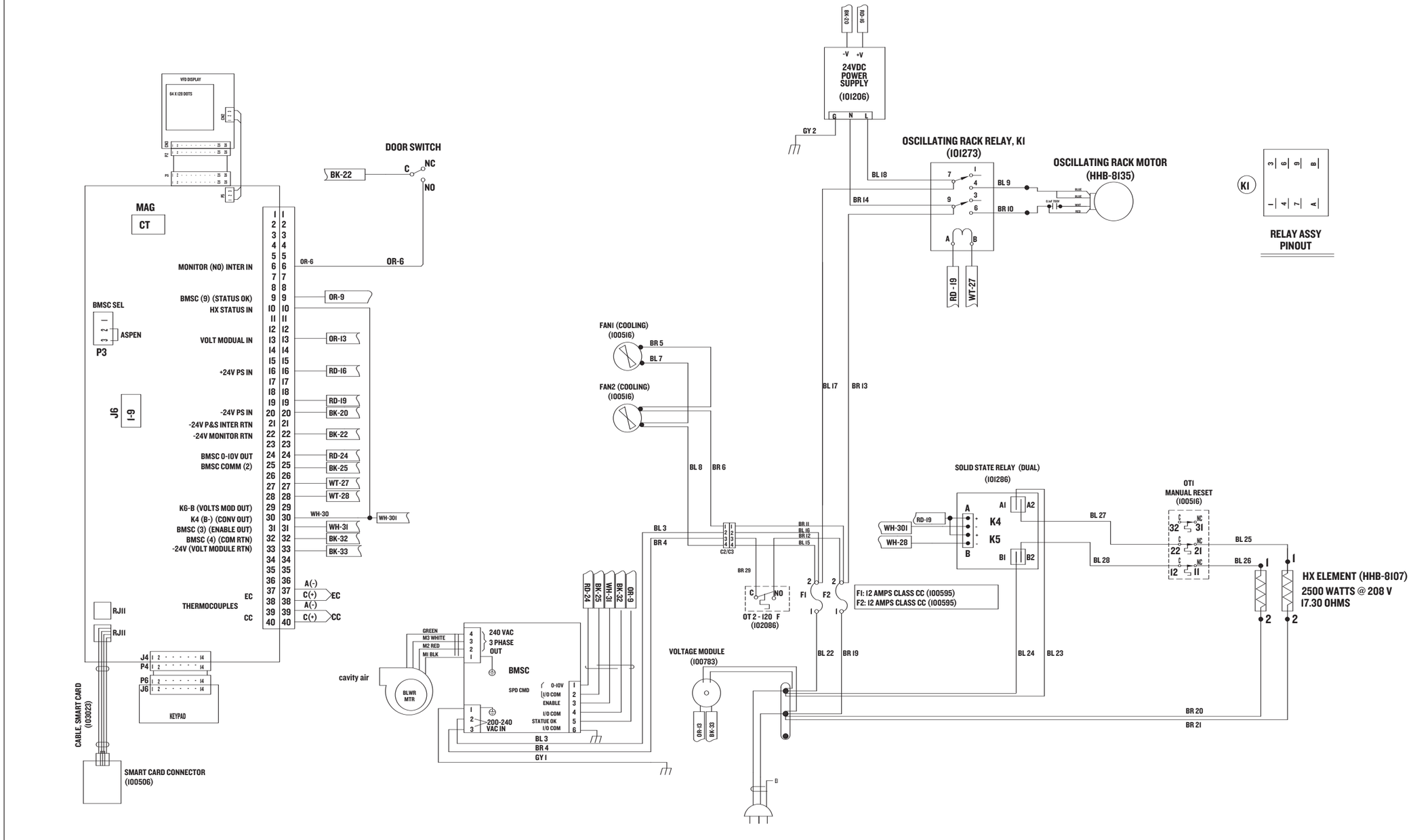


FIGURE 61: High h Batch Schematic

HHB OVEN SCHEMATIC

Figure 61. Inside of fold-out page. Rev 2 Board, VFD Display, Single Phase, 280/240 VAC, 60 Hz

NOTE: Schematic shows the oven with door open and without power applied.

Color Code (Line Voltage)

BL – Blue = Line V (208/240)
BR – Brown = Line V (208/240)
OR – Orange = 240 Line Input for Tap 3 on all Transformers
BK – Black = Hi-Temp 240 VAC Wire

Color Code (Low/Control Voltage)

BK – Black = 24 VDC Common
OR – Orange = Status Input
WH – White = Control Input
RD – Red = +24 VDC

Line Voltage Components

Blower Motor
Blower Motor Controller
Cooling Fans
Fuses
Heater Element
Power Supply, +24VDC
Rack Oscillator Motor
Relay
Solid State Relay
Thermostat – Cooling Fan
Thermostat – Hi-Limit
Voltage Sensor Module
Wiring Harness – Line Voltage

Low Voltage Components

Cable – Smart Card Connector
Display, VFD
Door Switch
I/O Control Board
Keypad
Ribbon Connector – Display
Smart Card Reader
Thermocouple – CC
Thermocouple – EC
Wiring Harness – Low Voltage

I/O CONTROL BOARD COMPONENT IDENTIFICATION AND TEST POINT LOCATIONS

Figure 62, page 64

J2	40-Pin Connector for LV Harness
J3	3-Pin Connector for VFD Display
J4	14-Pin Connector for Keypad
J5	26-Pin Connector for Display Data
J6	RS-232 Connector (for computer hookup, if necessary)
RJ11	Connector for Smart Card Cable
U15	EPROM Socket
P1	Voltage Reference 0-5 VDC
P3	Blower Controller Pin Configuration
SKP1	Beeper
R51	Beeper Volume Adjustment

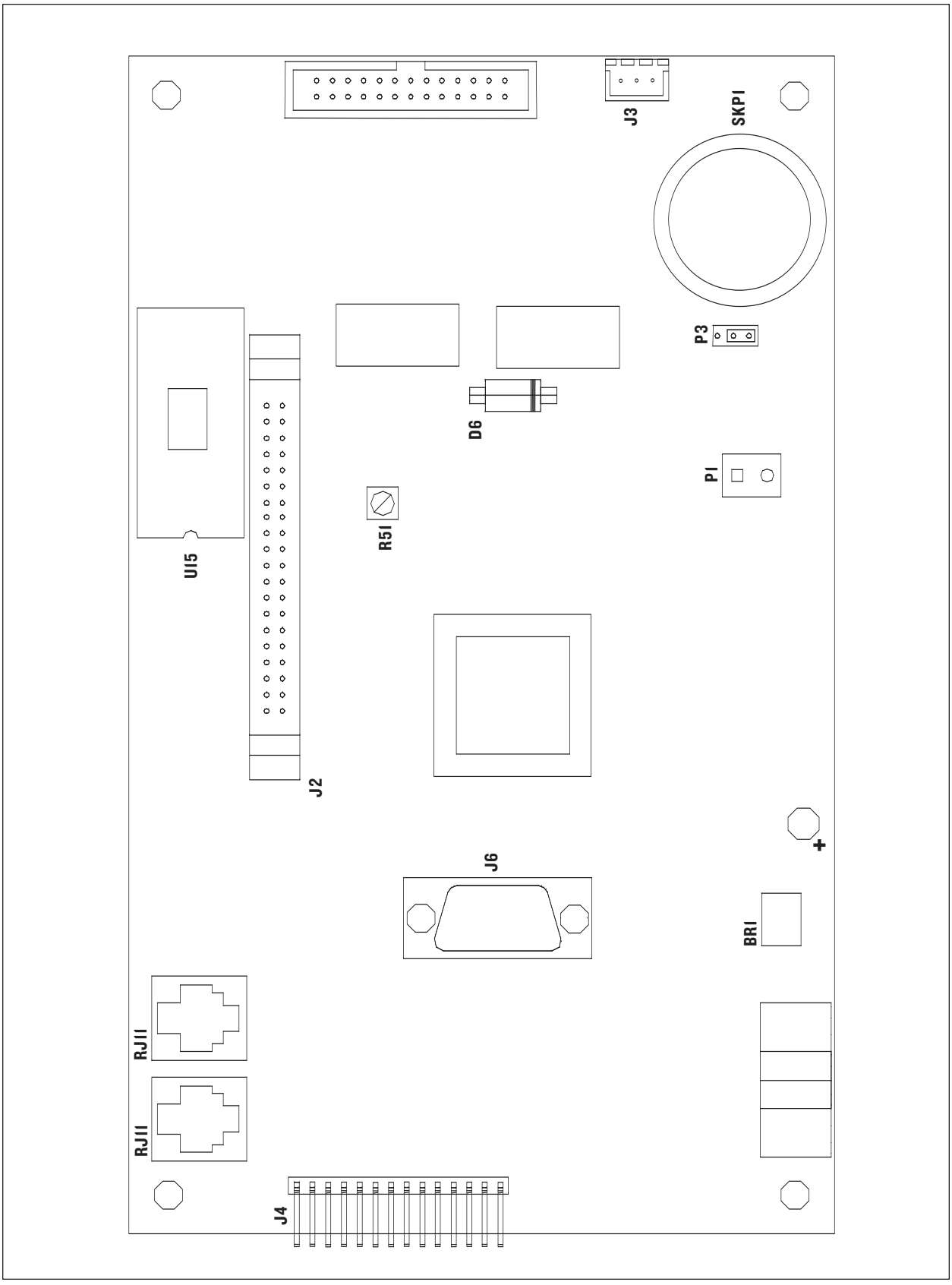


FIGURE 62: I/O Control Board and Test Point Locations

Comprehensive Part Listing

COMPREHENSIVE PART LISTING

PART	PART NUMBER	ILLUSTRATION
Air Diverter Plate	HHB-8030	Figure 59, page 57
Blower Motor	HHB-8106	Figure 55, page 53
Blower Motor Controller	100443	Figure 39, page 32
Blower Motor Cover	NGC-1081	Figure 55, page 53
Blower Motor Mounting Plate	HHB-8009	Not labeled
Bracket – Blower Motor Controller	HHB-8111	Figure 39, page 32
Bracket – Display (x2)	HHB-8130	Figure 41, page 34
Bracket – Rack Oscillator Motor	HHB-8049	Figure 46, page 41
Bushing – Swing Arm Assembly (x2)	100152	Figure 58, page 56
Cable – Smart Card Reader	103023	Figure 45, page 38
Cable Mount – Adhesive (x3)	100174	Not labeled
Catalytic Converter	HHB-8108	Figure 59, page 57
Component Plate	HHB-8055	Not labeled
Component Plate Shield	HHB-8088	Not labeled
Cooling Fan Finger Guard	100087	Figure 40, page 33
Cooling Fans – Inlet/Exhaust	100516	Figure 40, page 33
Cover – Cooling Fan (Exhaust)	HHB-8079	Figure 40, page 33
Cover – Drag Link/Left Swing Arm Assembly	HHB-8053	Not labeled
Cover – Right Swing Arm Assembly	HHB-8052	Not labeled
Crank – Rack Oscillator Motor	HHB-8045	Figure 46, page 41
Display	100505	Figure 41, page 34
Display Keypad	HHB-8064	Figure 42, page 35
Door	HHB-8080-2	Figure 51, page 49
Door Actuator	102789	Figure 54, page 52
Door Gasket	HHB-8101	Figure 52, page 50
Door Hinge	102807	Figure 53, page 51
Door Inner Plate	HHB-8083	Figure 52, page 50
Door Receiver	HHB-8084	Not labeled
Door Switch	102788	Figure 43, page 36
Door Switch/Actuator Mounting Bracket	HHB-8086	Figure 43, page 36
Drag Link – Swing Arm Assembly	HHB-8044	Figure 58, page 56
Drain Lid	HHB-8141	Figure 59, page 57
Drain Pan	101091	Figure 59, page 57
Drain Pan Rack	HHB-8105	Not labeled

PART	PART NUMBER	ILLUSTRATION
Electrical Plate	HHB-8134	Figure 50, page 45
Filter (x2)	HHB-8114	Figure 59, page 57
Filter Clip (x2)	HHB-8115	Figure 59, page 57
Fuse – Class CC, 12 AMP (x2)	100592	Figure 44, page 37
Fuse Cover	HHB-8136	Figure 44, page 37
Fuse Holder (x2)	100586	Figure 44, page 37
Grommet – Electrical Plate	100644	Figure 50, page 45
Heater Element	HHB-8099	Figure 56, page 54
Heater Insulation Shield	HHB-8097	Figure 56, page 54
Hole Plug (x2)	101191	Figure 53, page 51
I/O Control Board	NGC-1008	Figure 45, page 38
Insulation – Left Side Can	HHB-8041	Not labeled
Insulation – Main Can	HHB-8028	Not labeled
Insulation – Right Side Can	HHB-8029	Not labeled
Insulation – Top/Door	HHB-8085	Not labeled
Jetplate – High Coverage – Bottom (Accessory)	HHB-8155-1	Not labeled
Jetplate – High Coverage – Top (Accessory)	HHB-8155-2	Not labeled
Jetplate – Pizza – Bottom (Accessory)	HHB-8156-1	Not labeled
Jetplate – Pizza – Top (Accessory)	HHB-8156-2	Not labeled
Jetplate – Standard – Bottom	HHB-8013-1	Figure 57, page 55
Jetplate – Standard – Top	HHB-8013-2	Figure 57, page 55
Leg	100785	Not labeled
Leg – Non-Skid Pad	100786	Not labeled
Nut – Blower Motor (x6)	100905	Figure 55, page 53
Nut – Display (x2)	102963	Figure 41, page 34
Nut – Display Panel (x2)	100903	Figure 43, page 36
Nut – Electrical Plate Ground	100903	Figure 50, page 45
Nut – Pinches Wiring Harness to Terminal Block (x2)	100903	Not labeled
Nut – Smart Card Reader Standoff (x4)	102961	Not labeled
Nut (Flange) – Heater Element (x4)	100903	Figure 56, page 54
Nut (Jam) – Heater Element (x4)	102963	Figure 56, page 54
Panel – Display	HHB-8025	Figure 41, page 34
Panel – Left Side	HHB-8023-2	Figure 41, page 34
Panel – Right Side	HHB-8024-2	Figure 41, page 34
Power Cord	100187	Not labeled

PART	PART NUMBER	ILLUSTRATION
Power Cord Mounting Bracket	NGC-1167	Not labeled
Power Supply	101206	Figure 45, page 38
Push Nut (x2)	101293	Figure 53, page 51
Rack	HHB-8104	Figure 57, page 55
Rack – Offset (Accessory)	HHB-8118	Not labeled
Rack Oscillator Motor	HHB-8135	Figure 46, page 41
Relay	101273	Figure 45, page 38
Retaining Ring – Rack Oscillator Motor	101297	Figure 46, page 41
Retaining Ring – Swing Arm Assembly	101297	Not labeled
Ribbon Connector – Display	103024	Not labeled
Screw – Air Diverter Plate (x4)	101688	Figure 59, page 57
Screw – Blower Motor Controller (x4)	101688	Figure 39, page 32
Screw – Blower Motor Controller Bracket (x4)	101688	Figure 39, page 32
Screw – Blower Motor Cover (x8)	101688	Figure 55, page 53
Screw – Component Plate Standoff (x4)	102921	Not labeled
Screw – Cooling Fan Assy (4 x 2 fans = 8)	101694	Figure 40, page 33
Screw – Cooling Fan Cover (x3)	101688	Figure 40, page 33
Screw – Display (x4)	101520	Figure 41, page 34
Screw – Door Actuator (x2)	101421	Not labeled
Screw – Door Hinge (1 per hinge = 2 total)	101402	Figure 53, page 51
Screw – Door Hinge Receiver (x4)	101693	Not labeled
Screw – Door Inner Plate (x10)	102809	Figure 52, page 50
Screw – Door Switch/Actuator (x2)	101421	Figure 43, page 36
Screw – Drain Pan Rack (x3)	101688	Not labeled
Screw – Electrical Plate (x2)	102911	Figure 50, page 45
Screw – Front Side Panel (x2 per side)	101663	Figure 41, page 34
Screw – Fuse Cover	101688	Figure 44, page 37
Screw – Heater Element (x6)	101688	Figure 56, page 54
Screw – I/O Control Board (x4)	102910	Figure 45, page 38
Screw – I/O Control Board Standoff (x4)	102911	Not labeled
Screw – Power Supply (x3)	102911	Figure 45, page 38
Screw – Rack Oscillator Motor (x2)	101672	Figure 46, page 41
Screw – Rack Oscillator Motor Bracket (x2)	101688	Figure 46, page 41
Screw – Rack Oscillator Motor Crank	101714	Not labeled
Screw – Relay (x2)	101687	Figure 45, page 38

PART	PART NUMBER	ILLUSTRATION
Screw – Side Panel (8 per panel)	101688	Figure 41, page 34
Screw – Smart Card Reader (x4)	102911	Figure 45, page 38
Screw – Solid State Relay (x2)	101688	Figure 45, page 38
Screw – Terminal Block (x2)	102963	Not labeled
Screw – Thermocouple – Cook Chamber	101688	Figure 47, page 42
Screw – Thermostat Clamp	101688	Figure 49, page 44
Screw – Thermostat – Cooling Fan (x2)	101687	Figure 48, page 43
Screw – Thermostat – Hi-Limit (x2)	101672	Figure 49, page 44
Screw – Voltage Sensor	101688	Figure 50, page 45
Smart Card Reader	100506	Figure 45, page 38
Solid State Relay	101286	Figure 45, page 38
Standoff – Component Plate (x4)	102921	Not labeled
Standoff – I/O Control Board (x4)	101951	Figure 45, page 38
Standoff – Smart Card Reader (x4)	101947	Figure 45, page 38
Support Rail – Bottom Left	HHB-8058-1	Figure 57, page 55
Support Rail – Bottom Right	HHB-8058-2	Figure 57, page 55
Support Rails – Top (x2)	HHB-8117	Figure 57, page 55
Support Tube – Front Side Panel Screws (2 per panel)	HHB-8110	Not labeled
Swing Arm Assembly	HHB-8040	Figure 58, page 56
Swing Arm Assembly with Link Bar	HHB-8050	Figure 58, page 56
Thermocouple – Cook Chamber	NGC-1140	Figure 47, page 42
Thermocouple – Electrical Compartment	700-1199	Not labeled
Thermostat Clamp	NGC-1152	Figure 49, page 44
Thermostat – Cooling Fan	102086	Figure 48, page 43
Thermostat – Hi-Limit	102075	Figure 49, page 44
TurboChef Oven Cleaner	103180	Not labeled
TurboChef Oven Guard	103181	Not labeled
Voltage Sensor	100783	Figure 50, page 45
Washer – Rack Oscillator Motor	102451	Figure 46, page 41
Washer – Swing Arm Assembly	102451	Not labeled
Wiring Harness – Line Voltage	103022	Not labeled
Wiring Harness – Low Voltage	103021	Not labeled

HARDWARE DESCRIPTIONS

PART NUMBER	DESCRIPTION
100903	Nut – #10-32, Hex, Serrated, Flange, SS
100905	Nut – #1/4-20, Hex, Serrated, Flange,SS
101402	Screw – #10-32 X 1/4, PHFH
101421	Screw – #4-40 x 1/2, PHFH, 100 Deg, SS
101520	Screw – #4-40 X .25 Lg
101663	Screw – #8, Type A X 2-1/4, PHFH, Sheet Metal, SS
101672	Screw – M4 X .7 X 8, Sem, Internal Tooth
101687	Screw – #6-32 X 1/2, PPH, Sheet Metal, Drill Point, Zinc
101688	Screw – #8-15, Sheet Metal, Type A, PTRHD, Serrated
101693	Screw – #10-32 X 1/4, PHTRH, SS
101694	Screw – #10-32 X 1/2, PPHD, Thread Cutting, Cres or Other
101714	Screw – Set, #8-32 X 3/16, Skt Hd, BO Steel
101913	Standoff – #8-32 X 1.25 Lg, Hex, M/F, Zinc
101947	Standoff – #6-32 X 1.25 Lg, M/F, Zinc-plated Steel
101951	Standoff – #6-32 X 5/8 X .25 Hex, F/F, Zinc
102809	Screw – #8-32 X 3/8, PFLH, 100 Deg, SS
102910	Screw – #6-32 X 1/4, Sems, Internal Tooth, PPHD, Cres
102911	Screw – #6-32 X 3/8, PPH, Sem, Internal Tooth, SS
102921	Screw – #8-32 X 3/8, PPHD, Sem, Internal Tooth, SS
102961	Nut – #6-32 KEPS, External Tooth, SS
102963	Nut – #10-32, Keps, External Tooth, SS

Glossary of Terms

Air Diffuser Plate
Accessory plate that covers openings in the jetplate for very delicate cooking.

Air Diverter Plate
Covers the Catalytic Converter.

Blower Motor
Located in back of oven, the Blower Motor actuates the impingement process. Actuated by Blower Motor Controller.

Blower Motor Controller (BMSC)
Proprietary brushless DC Blower Motor Controller actuates the Blower Motor.

Catalytic Converter
Part of Filtering System, the Catalytic Converter cleans recirculating airflow.

CC Thermocouple
See Thermocouple – CC

Component Plate
Plate to which the I/O Control Board, Power Supply, Relay, Smart Card Reader, and Solid State Relay are attached.

Control Board
See I/O Control Board

Control System
System that signals, senses, commands, and actuates the oven's other various components.

Cook Chamber
Chamber in which food cooks.

Cook Chamber Temperature
Actual temperature of the Cook Chamber registered by the Cook Chamber Thermocouple.

Cook Counter
Function on Test Mode Menu that displays number of Cook Cycles the oven has completed.

Cook Cycle
All operative aspects of cooking a product.

Cook Time
Function on Test Mode Menu that displays the cumulative time of Cook Cycles.

Cool-down State
State during which the Blower Motor blows cool air into the Cook Chamber until the temperature is below 150ºF (66°C). Takes approx. 90 minutes.

Cooling Fans
Inlet and exhaust fans that ventilate the Electrical Compartment.

Cooling Fan – Exhaust
Air that ventilates the Electrical Compartment exits through the exhaust fan.

Cooling Fan – Inlet
Air that ventilates the Electrical Compartment enters through the inlet fan.

Cooling Fan Thermostat
See Thermostat – Cooling Fan

Cumulative Operating Time
Function on Test Mode Menu that displays cumulative time of oven operation (i.e., total time oven has been on).

Daily Maintenance
Procedure that operator should apply every day to ensure oven remains in optimal condition.

Deep Clean
Process that operator and/or technician should apply approximately once per month (or more frequently as needed) to ensure oven remains in optimal condition.

Demonstration Mode
Accessible from the Options Menu. Allows the operator to view/show every operational aspect of the oven without the oven actually heating up.

Diagnostic Mode
Function that displays diagnostic information during all operative activities.

Display
Screen through which operator and oven interact.

Display Keypad
The primary interface for the operator.

Done Screen
Screen at the end of a Cook Cycle from which the operator can save an adjusted cook time or cook an item longer than its predetermined cook time.

Door Actuator
Magnet in oven door. Detected by Door Switch to determine if door is open or closed.

Door – Inner Plate
Plate that covers door gasket.

Door Receiver
Mechanism in each hinge slot to which the oven hinges attach.

Door Switch
Sensor that detects actuator. The Control System determines whether the door is open or closed via the Door Switch.

Drag Link
Bar that connects Rack Oscillator Motor to left Swing Arm Assembly.

Drain Lid
Lid at bottom of Cook Chamber through which (when opened) excess debris is funneled into the drain pan.

Drain Pan
Removable metal pan that collects grease and food particles that drain from Cook Chamber.

Drain Pan Rack
Supports drain pan; attached to bottom of oven.

EC Thermocouple
See Thermocouple – EC

Edit Menu
Menu from which operator/technician can modify Cook Chamber temperature, recipes, and recipe settings. The oven must be in either Off State or Cool-down State for operator to be able to access the Edit Menu.

Electrical Compartment
Area that houses Control System components.

Electrical Compartment Temperature
Actual temperature of the Electrical Compartment registered by the EC Thermocouple.

Electrical Plate
Plate to which terminal block and Voltage Sensor are attached.

Error Message
A message that is displayed when an unusual event occurs. The screen will display an error message only when the error occurs. Error messages are not logged in the Fault Log.

Event
Subset of Food Item. An event is a portion of a Cook Cycle in which the operator can specify a difference in blower intensity. Each food item can potentially be broken into four events, or “phases.”

Exhaust Fan
See Cooling Fan – Exhaust

Fan
See Cooling Fans

Fault Codes
Code numbers (F1–F8) that describe faults or errors the oven has encountered.

Fault Log
Located in Test Mode, the Fault Log (or "Fault Code Counter") lists each fault code and number of times oven has encountered each. The Fault Log logs up to 255 instances per fault before rolling back to zero.

Filter
Easy-to-remove filters help prolong the life of the Catalytic Converter by trapping excess grease. The filters are attached to the Air Diverter Plate via Filter Clips.

Filter Clip
Attaches filter to Air Diverter Plate.

Filtering System
Helps remove debris from Cook Chamber.

Food Group
Subset of Menu, superset of Food Item. Each food group contains 6 recipes, or "food items." 12 total food groups exist, comprising a Menu.

Food Item
Subset of a Food Group. Operator programs food items (or "recipes") to preset cook times and specify events.

Heater Element
Sheathed-style/Calrod heaters. Attached to the same cartridge, heaters A and B can be tested independently of one another.

Heater Insulation Shield
Protective rubber shield that prevents Heater Element from touching insulation covering.

Hi-Limit Thermostat
See Thermostat – Hi-Limit

I/O Control Board
Controls every oven component. See Figure 62, page 64 for test point locations.

Impingement Circuit
System that provides the high temperature airflow necessary to brown and cook food items.

Inlet Fan
See Cooling Fan – Inlet

Inner Plate
See Door – Inner Plate

Jetplates
Top and bottom plates within the Cook Chamber that can be removed/replaced to increase or decrease heat transfer rates.

Keypad
See Display Keypad

Link Bar
Connects left and right Swing Arm Assemblies to ensure synchronized rack oscillation.

Mechanical Relay
See Relay

Menu
See Recipe Menu

Motor
See Blower Motor

Motor Controller
See Blower Motor Controller

Off State
Impingement Circuit is off and Cook Chamber temperature is below 150ºF (66ºC), but Control System remains operational. When the oven is off, the operator/technician can access the Edit Menu, Options Menu, and Test Mode Menu.

Options Menu
Menu from which operator can enable/disable various operative functions. The oven must be in either Off or Cool-down State to access Options Menu.

Oven Rack
See Rack

Percentage (%) Air
Function that allows operator/technician to specify the relative amount of impingement airflow (speed of Blower Motor) during each Cook Cycle event. Valid percentages are between 10 and 100%.

NOTE: Maximum 100% = 7100 RPM Blower Motor Speed. Blower Motor Speed scale is linear.

Percentage (%) Time
Function that allows operator/technician to specify the duration of each Cook Cycle event. Percentages across events must add up to 100%.

Power Supply
24 VDC Output at 40 Watts. Supplies control voltage for I/O Control Board, Relay, and Solid State Relay.

Rack
Wire rack that when attached to oscillator pins, oscillates to allow the food item to cook evenly.

Rack Oscillator Motor
The Rack Oscillator Motor actuates the left Swing Arm Assembly. Actuated by Mechanical Relay.

Ready to Cook State
The oven is "ready to cook" when it has warmed to the preset Cook Chamber temperature. At this point, operator can enter cook commands via the keypad.

Receiver
See Door Receiver

Recipe
See Food Item

Recipe Counter
Option that displays how many times each recipe (food item) has been used.

Recipe Menu
Highest superset of recipes, the menu consists of 12 food groups of 6 recipes, or 72 recipes total.

Relay
240 VAC, 30 Amp, Double Pole, Double Throw, 24 VDC Relay Coil. Actuates Rack Oscillator Motor.

Serial Number
Unique serial number issued to oven that can be viewed from the Test Mode Menu.

Smart Card
A Smart Card can synchronize with the oven's control system to overwrite (or be overwritten of) existing recipes.

Smart Card Reader
Reads Smart Card and synchronizes with Recipe Menu stored in oven.

Solid State Relay (SSR)
240 VAC, Dual 40 Amp Solid State Relay. Actuates the Heater Element. When the SSR is actuated, the (-) control input will go to 0.00 VDC. When not actuated, the control input will read -24.00 VDC.

Status Indicators
Letters at bottom of the Test Mode Menu that help in troubleshooting the Door (D), Heater A (left H), Heater B (right H), and Blower (A). The operator also has the option to turn on status indicators for all operative activities via the Diagnostic Mode function.

Support Rails
Rails that support top and bottom Jetplates.

Swing Arm Assembly
Located behind Swing Arm Covers, mechanisms on either side of the oven that actuate rack oscillation.

Temperature Offset
Feature that provides accurate temperature readings of where food actually cooks as opposed to where thermometer is located. Can be modified in Test Mode Menu.

Test Mode Menu
Menu from which technician can run diagnostics and check statistics. The oven must be in either the Off State or Cool-down State to access the Test Mode Menu.

Thermocouple – CC
Cook Chamber Thermocouple. This Type K thermocouple measures the temperature of the recirculating impingement airflow.

Thermocouple – EC
Electrical Compartment Thermocouple. Located on the I/O Control Board, this Type K Thermocouple measures the temperature of the Electrical Compartment.

Thermostat – Cooling Fan
Actuates the cooling fans when EC temperature reaches or exceeds 120°F (49°C).

Thermostat – Hi-Limit
The Hi-Limit Thermostat is a 250VAC, 3-Pole, manual-reset thermostat with a trip point of 572ºF (300°C). The Thermostat, which interrupts power to the Heater Element, should never operate during normal operation.

Time Screen
Screen from which operator can adjust total cook time before initiating a Cook Cycle.

Total Cook Time
Temporal measurement of a Cook Cycle.

TurboChef Oven Cleaner
Cleaning solution that is safe to use on the High h Batch oven. Using other cleaners may damage critical parts and void warranty. To order call 800.90TURBO.

Voltage Sensor
Proprietary device designed to measure incoming line voltage and switch between 208 and 240 VAC operation. The sensor is only included in ovens operated in North and South America.

Warm-up State
State during which the oven warms itself to the predetermined Cook Chamber temperature.

Wiring Harness
System of wires that distributes power to each of the oven's components. Consists of Low-voltage harness and Line-voltage harness.

Write Card Function
Function that allows operator to save a Recipe Menu to a Smart Card. This function can be enabled or disabled in the Options Menu, as overwriting a Smart Card is not generally recommended.

Subject Index

For further information call:

Customer Service *at* 800.90TURBO

Sales and Marketing *at* 866.90TURBO

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